
Bibliography

- (Abazajian *et al.*, 2009) K. N. Abazajian, J. K. Adelman-McCarthy, M. A. Agüeros, S. S. Allam, C. Allende Prieto, D. An, K. S. J. Anderson, S. F. Anderson, J. Annis, N. A. Bahcall, et al., *The Seventh Data Release of the Sloan Digital Sky Survey*, *Astrophysical Journal Supplement* **182**, 543 (2009), arXiv:0812.0649.
- (Abdalla *et al.*, 2012) F. Abdalla, J. Annis, D. Bacon, S. Bridle, F. Castander, M. Colless, D. DePoy, H. T. Diehl, M. Erikson, B. Flaugher, J. Frieman, E. Gaztanaga, C. Hogan, S. Jouvel, S. Kent, D. Kirk, R. Kron, S. Kuhlmann, O. Lahav, J. Lawrence, H. Lin, J. Marriner, J. Marshall, J. Mohr, R. C. Nichol, M. Sako, W. Saunders, M. Soares-Santos, D. Thomas, R. Wechsler, A. West, H. Wu, *The Dark Energy Spectrometer (DESpec): A Multi-Fiber Spectroscopic Upgrade of the Dark Energy Camera and Survey for the Blanco Telescope*, arXiv e-prints , arXiv:1209.2451 (2012), arXiv:1209.2451 [astro-ph.CO].
- (Abel, Hahn & Kaehler, 2012) T. Abel, O. Hahn, R. Kaehler, *Tracing the dark matter sheet in phase space*, *Monthly Notices of the Royal Astronomical Society* **427**, 61 (2012), arXiv:1111.3944 [astro-ph.CO].
- (Albrecht & Steinhardt, 1982) A. Albrecht, P. J. Steinhardt, *Cosmology for grand unified theories with radiatively induced symmetry breaking*, *Physical Review Letters* **48**, 1220 (1982).
- (Alcock & Paczynski, 1979) C. Alcock, B. Paczynski, *An evolution free test for non-zero cosmological constant*, *Nature* **281**, 358 (1979).
- (Alonso, Eardley & Peacock, 2015) D. Alonso, E. Eardley, J. A. Peacock, *Halo abundances within the cosmic web*, *Monthly Notices of the Royal Astronomical Society* **447**, 2683 (2015), arXiv:1406.4159.
- (Alpher, Bethe & Gamow, 1948) R. A. Alpher, H. Bethe, G. Gamow, *The Origin of Chemical Elements*, *Physical Review* **73**, 803 (1948).
- (Altay, Colberg & Croft, 2006) G. Altay, J. M. Colberg, R. A. C. Croft, *The influence of large-scale structures on halo shapes and alignments*, *Monthly Notices of the Royal Astronomical Society* **370**, 1422 (2006), astro-ph/0605296.
- (Amendola *et al.*, 2013) L. Amendola, S. Appleby, D. Bacon, T. Baker, M. Baldi, N. Bartolo, A. Blanchard, C. Bonvin, S. Borgani, E. Branchini, C. Burridge, S. Camera, C. Carbone, L. Casarini, M. Cropper, C. de Rham, C. Di Porto, A. Ealet, P. G. Ferreira, F. Finelli, J. García-Bellido, T. Giannantonio, L. Guzzo, A. Heavens, L. Heisenberg, C. Heymans, H. Hoekstra, L. Hollenstein, R. Holmes, O. Horst, K. Jahnke, T. D. Kitching, T. Koivisto, M. Kunz, G. La Vacca, M. March, E. Majerotto, K. Markovic, D. Marsh, F. Marulli, R. Massey, Y. Mellier, D. F. Mota, N. Nunes, W. Percival, V. Pettorino, C. Porcellani, C. Quercellini, J. Read, M. Rinaldi, D. Sapone, R. Scaramella, C. Skordis, F. Simpson, A. Taylor, S. Thomas, R. Trotta, L. Verde, F. Vernizzi, A. Vollmer, Y. Wang, J. Weller, T. Zlosnik, *Cosmology and Fundamental Physics with the Euclid Satellite*, *Living Reviews in Relativity* **16**, 6 (2013), arXiv:1206.1225.
- (Anderes, Wandelt & Lavaux, 2015) E. Anderes, B. D. Wandelt, G. Lavaux, *Bayesian Inference of CMB Gravitational Lensing*, *Astrophysical Journal* **808**, 152 (2015), arXiv:1412.4079.
- (Aragon-Calvo & Szalay, 2013) M. A. Aragon-Calvo, A. S. Szalay, *The hierarchical structure and dynamics of voids*, *Monthly Notices of the Royal Astronomical Society* **428**, 3409 (2013), arXiv:1203.0248 [astro-ph.CO].
- (Aragon-Calvo & Yang, 2014) M. A. Aragon-Calvo, L. F. Yang, *The hierarchical nature of the spin alignment of dark matter haloes in filaments*, *Monthly Notices of the Royal Astronomical Society* **440**, L46 (2014), arXiv:1303.1590 [astro-ph.CO].
- (Aragón-Calvo, van de Weygaert & Jones, 2010) M. A. Aragón-Calvo, R. van de Weygaert, B. J. T. Jones, *Multiscale phenomenology of the cosmic web*, *Monthly Notices of the Royal Astronomical Society* **408**, 2163 (2010), arXiv:1007.0742 [astro-ph.CO].
- (Aragón-Calvo *et al.*, 2007) M. A. Aragón-Calvo, B. J. T. Jones, R. van de Weygaert, J. M. van der Hulst, *The multiscale morphology filter: identifying and extracting spatial patterns in the galaxy distribution*, *Astronomy and Astrophysics* **474**, 315 (2007), arXiv:0705.2072.

- (Arber, 1954) A. R. Arber, *The Mind and the Eye* (Cambridge University Press, 1954).
- (Ata, Kitaura & Müller, 2015) M. Ata, F.-S. Kitaura, V. Müller, *Bayesian inference of cosmic density fields from non-linear, scale-dependent, and stochastic biased tracers*, Monthly Notices of the Royal Astronomical Society **446**, 4250 (2015), arXiv:1408.2566.
- (Aung & Cohn, 2016) H. Aung, J. D. Cohn, *Mean maps for cosmic web structures in cosmological initial conditions*, Monthly Notices of the Royal Astronomical Society **456**, 909 (2016), arXiv:1505.07887.
- (Babul & Starkman, 1992) A. Babul, G. D. Starkman, *A quantitative measure of structure in the three-dimensional galaxy distribution - Sheets and filaments*, Astrophysical Journal **401**, 28 (1992).
- (Bagla & Padmanabhan, 1994) J. S. Bagla, T. Padmanabhan, *Nonlinear Evolution of Density Perturbations Using the Approximate Constancy of the Gravitational Potential*, Monthly Notices of the Royal Astronomical Society **266**, 227 (1994), arXiv:gr-qc/9304021 [gr-qc].
- (Bardeen, 1980) J. M. Bardeen, *Gauge-invariant cosmological perturbations*, Physical Review D **22**, 1882 (1980).
- (Bardeen, Steinhardt & Turner, 1983) J. M. Bardeen, P. J. Steinhardt, M. S. Turner, *Spontaneous creation of almost scale-free density perturbations in an inflationary universe*, Physical Review D **28**, 679 (1983).
- (Bardeen et al., 1986) J. M. Bardeen, J. R. Bond, N. Kaiser, A. S. Szalay, *The statistics of peaks of Gaussian random fields*, Astrophysical Journal **304**, 15 (1986).
- (Barrow, Bhavsar & Sonoda, 1985) J. D. Barrow, S. P. Bhavsar, D. H. Sonoda, *Minimal spanning trees, filaments and galaxy clustering*, Monthly Notices of the Royal Astronomical Society **216**, 17 (1985).
- (Baumann, 2011) D. Baumann, *The Physics of Inflation* (2011).
- (Baumann et al., 2012) D. Baumann, A. Nicolis, L. Senatore, M. Zaldarriaga, *Cosmological non-linearities as an effective fluid*, Journal of Cosmology and Astroparticle Physics **7**, 051 (2012), arXiv:1004.2488 [astro-ph.CO].
- (Bellman, 1961) R. E. Bellman, *Adaptive Control Processes: A Guided Tour* (Princeton University Press, 1961).
- (Benítez et al., 2015) N. Benítez, R. Dupke, M. Moles, L. Sodré, A. J. Cenarro, A. Marín Franch, K. Taylor, D. Cristóbal, A. Fernández-Soto, C. Mendes de Oliveira, J. Cepa-Nogué, L. R. Abramo, J. S. Alcaniz, R. Overzier, C. Hernández-Monteagudo, E. J. Alfaro, A. Kanaan, M. Carvano, R. R. R. Reis, J-PAS collaboration, *J-PAS: The Javalambre-Physics of the Accelerated Universe Astrophysical Survey*, in *Highlights of Spanish Astrophysics VIII*, edited by A. J. Cenarro, F. Figueras, C. Hernández-Monteagudo, J. Trujillo Bueno, L. Valdvielso (2015) pp. 148–153, arXiv:1403.5237 [astro-ph.CO].
- (Benson et al., 2003) A. J. Benson, F. Hoyle, F. Torres, M. S. Vogeley, *Galaxy voids in cold dark matter universes*, Monthly Notices of the Royal Astronomical Society **340**, 160 (2003), astro-ph/0208257.
- (Berger, 1985) J. O. Berger, *Statistical decision theory and Bayesian analysis* (Springer, 1985).
- (Bernardeau, 1994) F. Bernardeau, *The nonlinear evolution of rare events*, Astrophysical Journal **427**, 51 (1994), astro-ph/9311066.
- (Bernardeau et al., 2002) F. Bernardeau, S. Colombi, E. Gaztañaga, R. Scoccimarro, *Large-scale structure of the Universe and cosmological perturbation theory*, Physics Reports **367**, 1 (2002), astro-ph/0112551.
- (Bertschinger, 1998) E. Bertschinger, *Simulations of Structure Formation in the Universe*, Annual review of astronomy and astrophysics **36**, 599 (1998).
- (Bertschinger, 2001) E. Bertschinger, *Multiscale Gaussian Random Fields and Their Application to Cosmological Simulations*, Astrophysical Journal Supplement **137**, 1 (2001), astro-ph/0103301.
- (Bertschinger, 1987) E. Bertschinger, *Path integral methods for primordial density perturbations - Sampling of constrained Gaussian random fields*, Astrophysical Journal Letters **323**, L103 (1987).
- (Bertschinger & Jain, 1994) E. Bertschinger, B. Jain, *Gravitational instability of cold matter*, Astrophysical Journal **431**, 486 (1994), arXiv:astro-ph/9307033.

- (Betancort-Rijo *et al.*, 2009) J. Betancort-Rijo, S. G. Patiri, F. Prada, A. E. Romano, *The statistics of voids as a tool to constrain cosmological parameters: σ_8 and $\Omega_m h$* , *Monthly Notices of the Royal Astronomical Society* **400**, 1835 (2009), arXiv:0901.1609.
- (Birdsall & Langdon, 1985) C. K. Birdsall, A. B. Langdon, *Plasma Physics via Computer Simulation* (CRC Press, 1985).
- (Biswas, Alizadeh & Wandelt, 2010) R. Biswas, E. Alizadeh, B. D. Wandelt, *Voids as a precision probe of dark energy*, *Physical Review D* **82**, 023002 (2010), arXiv:1002.0014 [astro-ph.CO].
- (Blanton & Roweis, 2007) M. R. Blanton, S. Roweis, *K-Corrections and Filter Transformations in the Ultraviolet, Optical, and Near-Infrared*, *Astronomical Journal* **133**, 734 (2007), astro-ph/0606170.
- (Blanton *et al.*, 2003a) M. R. Blanton, H. Lin, R. H. Lupton, F. M. Maley, N. Young, I. Zehavi, J. Loveday, *An Efficient Targeting Strategy for Multiobject Spectrograph Surveys: the Sloan Digital Sky Survey “Tiling” Algorithm*, *Astronomical Journal* **125**, 2276 (2003a), astro-ph/0105535.
- (Blanton *et al.*, 2003b) M. R. Blanton, J. Brinkmann, I. Csabai, M. Doi, D. Eisenstein, M. Fukugita, J. E. Gunn, D. W. Hogg, D. J. Schlegel, *Estimating Fixed-Frame Galaxy Magnitudes in the Sloan Digital Sky Survey*, *Astronomical Journal* **125**, 2348 (2003b), astro-ph/0205243.
- (Blanton *et al.*, 2005) M. R. Blanton, D. J. Schlegel, M. A. Strauss, J. Brinkmann, D. Finkbeiner, M. Fukugita, J. E. Gunn, D. W. Hogg, Ž. Ivezić, G. R. Knapp, R. H. Lupton, J. A. Munn, D. P. Schneider, M. Tegmark, I. Zehavi, *New York University Value-Added Galaxy Catalog: A Galaxy Catalog Based on New Public Surveys*, *Astronomical Journal* **129**, 2562 (2005), astro-ph/0410166.
- (Blanton *et al.*, 2003c) M. R. Blanton, D. W. Hogg, N. A. Bahcall, J. Brinkmann, M. Britton, A. J. Connolly, I. Csabai, M. Fukugita, J. Loveday, A. Meiksin, J. A. Munn, R. C. Nichol, S. Okamura, T. Quinn, D. P. Schneider, K. Shimasaku, M. A. Strauss, M. Tegmark, M. S. Vogeley, D. H. Weinberg, *The Galaxy Luminosity Function and Luminosity Density at Redshift $z = 0.1$* , *Astrophysical Journal* **592**, 819 (2003c), astro-ph/0210215.
- (Blas, Lesgourgues & Tram, 2011) D. Blas, J. Lesgourgues, T. Tram, *The Cosmic Linear Anisotropy Solving System (CLASS). Part II: Approximation schemes*, *Journal of Cosmology and Astroparticle Physics* **7**, 034 (2011), arXiv:1104.2933 [astro-ph.CO].
- (Blumenthal *et al.*, 1984) G. R. Blumenthal, S. M. Faber, J. R. Primack, M. J. Rees, *Formation of galaxies and large-scale structure with cold dark matter*, *Nature* **311**, 517 (1984).
- (Blumenthal *et al.*, 1992) G. R. Blumenthal, L. N. da Costa, D. S. Goldwirth, M. Lecar, T. Piran, *The largest possible voids*, *Astrophysical Journal* **388**, 234 (1992).
- (Bond & Szalay, 1983) J. R. Bond, A. S. Szalay, *The collisionless damping of density fluctuations in an expanding universe*, *Astrophysical Journal* **274**, 443 (1983).
- (Bond, Kofman & Pogosyan, 1996) J. R. Bond, L. Kofman, D. Pogosyan, *How filaments of galaxies are woven into the cosmic web*, *Nature* **380**, 603 (1996), astro-ph/9512141.
- (Bond, Szalay & Turner, 1982) J. R. Bond, A. S. Szalay, M. S. Turner, *Formation of galaxies in a gravitino-dominated universe*, *Physical Review Letters* **48**, 1636 (1982).
- (Bond, Strauss & Cen, 2010) N. A. Bond, M. A. Strauss, R. Cen, *Crawling the cosmic network: identifying and quantifying filamentary structure*, *Monthly Notices of the Royal Astronomical Society* **409**, 156 (2010), arXiv:1003.3237 [astro-ph.CO].
- (Bos *et al.*, 2012) E. G. P. Bos, R. van de Weygaert, K. Dolag, V. Pettorino, *The darkness that shaped the void: dark energy and cosmic voids*, *Monthly Notices of the Royal Astronomical Society* **426**, 440 (2012), arXiv:1205.4238 [astro-ph.CO].
- (Bouchet *et al.*, 1995) F. R. Bouchet, S. Colombi, E. Hivon, R. Juszkiewicz, *Perturbative Lagrangian approach to gravitational instability*, *Astronomy and Astrophysics* **296**, 575 (1995), astro-ph/9406013.

- (Brainerd, Scherrer & Villumsen, 1993) T. G. Brainerd, R. J. Scherrer, J. V. Villumsen, *Linear Evolution of the Gravitational Potential: A New Approximation for the Nonlinear Evolution of Large-Scale Structure*, *Astrophysical Journal* **418**, 570 (1993).
- (Bryan, Cameron & Allen, 1999) M. Bryan, J. Cameron, C. A. Allen, *The Artist's Way at Work: Riding the Dragon* (William Morrow, 1999).
- (Buchert, 1989) T. Buchert, *A class of solutions in Newtonian cosmology and the pancake theory*, *Astronomy and Astrophysics* **223**, 9 (1989).
- (Buchert, Melott & Weiß, 1994) T. Buchert, A. L. Melott, A. G. Weiß, *Testing higher-order Lagrangian perturbation theory against numerical simulations I. Pancake models*, *Astronomy and Astrophysics* **288**, 349 (1994), astro-ph/9309056.
- (Cai *et al.*, 2010) Y.-C. Cai, S. Cole, A. Jenkins, C. S. Frenk, *Full-sky map of the ISW and Rees-Scrimshaw effect from Gpc simulations*, *Monthly Notices of the Royal Astronomical Society* **407**, 201 (2010), arXiv:1003.0974 [astro-ph.CO].
- (Cai *et al.*, 2014) Y.-C. Cai, M. C. Neyrinck, I. Szapudi, S. Cole, C. S. Frenk, *A Possible Cold Imprint of Voids on the Microwave Background Radiation*, *Astrophysical Journal* **786**, 110 (2014), arXiv:1301.6136 [astro-ph.CO].
- (Cameron & Pettitt, 2012) E. Cameron, A. N. Pettitt, *Approximate Bayesian Computation for astronomical model analysis: a case study in galaxy demographics and morphological transformation at high redshift*, *Monthly Notices of the Royal Astronomical Society* **425**, 44 (2012), arXiv:1202.1426 [astro-ph.IM].
- (Carlesi *et al.*, 2014) E. Carlesi, A. Knebe, G. F. Lewis, S. Wales, G. Yepes, *Hydrodynamical simulations of coupled and uncoupled quintessence models - I. Halo properties and the cosmic web*, *Monthly Notices of the Royal Astronomical Society* **439**, 2943 (2014), arXiv:1401.5005 [astro-ph.CO].
- (Carrasco, Hertzberg & Senatore, 2012) J. J. M. Carrasco, M. P. Hertzberg, L. Senatore, *The effective field theory of cosmological large scale structures*, *Journal of High Energy Physics* **9**, 82 (2012), arXiv:1206.2926 [astro-ph.CO].
- (Carroll, Press & Turner, 1992) S. M. Carroll, W. H. Press, E. L. Turner, *The cosmological constant*, *Annual review of astronomy and astrophysics* **30**, 499 (1992).
- (Carron, 2012) J. Carron, *Information Escaping the Correlation Hierarchy of the Convergence Field in the Study of Cosmological Parameters*, *Physical Review Letters* **108**, 071301 (2012), arXiv:1201.1000 [astro-ph.IM].
- (Carron & Neyrinck, 2012) J. Carron, M. C. Neyrinck, *On the Inadequacy of N-point Correlation Functions to Describe Nonlinear Cosmological Fields: Explicit Examples and Connection to Simulations*, *Astrophysical Journal* **750**, 28 (2012), arXiv:1201.1444 [astro-ph.CO].
- (Casas-Miranda *et al.*, 2002) R. Casas-Miranda, H. J. Mo, R. K. Sheth, G. Boerner, *On the distribution of haloes, galaxies and mass*, *Monthly Notices of the Royal Astronomical Society* **333**, 730 (2002), astro-ph/0105008.
- (Cautun & van de Weygaert, 2011) M. C. Cautun, R. van de Weygaert, *The DTFS public software - The Delaunay Tessellation Field Estimator code*, ArXiv e-prints (2011), arXiv:1105.0370 [astro-ph.IM].
- (Cautun, van de Weygaert & Jones, 2013) M. Cautun, R. van de Weygaert, B. J. T. Jones, *NEXUS: tracing the cosmic web connection*, *Monthly Notices of the Royal Astronomical Society* **429**, 1286 (2013), arXiv:1209.2043 [astro-ph.CO].
- (Cautun *et al.*, 2014) M. Cautun, R. van de Weygaert, B. J. T. Jones, C. S. Frenk, *Evolution of the cosmic web*, *Monthly Notices of the Royal Astronomical Society* **441**, 2923 (2014), arXiv:1401.7866.
- (Ceccarelli *et al.*, 2013) L. Ceccarelli, D. Paz, M. Lares, N. Padilla, D. G. Lambas, *Clues on void evolution - I. Large-scale galaxy distributions around voids*, *Monthly Notices of the Royal Astronomical Society* **434**, 1435 (2013), arXiv:1306.5798 [astro-ph.CO].
- (Chan, 2014) K. C. Chan, *Helmholtz decomposition of the Lagrangian displacement*, *Physical Review D* **89**, 083515 (2014), arXiv:1309.2243.

- (Clampitt & Jain, 2015) J. Clampitt, B. Jain, *Lensing measurements of the mass distribution in SDSS voids*, Monthly Notices of the Royal Astronomical Society **454**, 3357 (2015), arXiv:1404.1834.
- (Clampitt, Cai & Li, 2013) J. Clampitt, Y.-C. Cai, B. Li, *Voids in modified gravity: excursion set predictions*, Monthly Notices of the Royal Astronomical Society **431**, 749 (2013), arXiv:1212.2216 [astro-ph.CO].
- (Codis *et al.*, 2012) S. Codis, C. Pichon, J. Devriendt, A. Slyz, D. Pogosyan, Y. Dubois, T. Sousbie, *Connecting the cosmic web to the spin of dark haloes: implications for galaxy formation*, Monthly Notices of the Royal Astronomical Society **427**, 3320 (2012), arXiv:1201.5794 [astro-ph.CO].
- (Codis *et al.*, 2015) S. Codis, R. Gavazzi, Y. Dubois, C. Pichon, K. Benabed, V. Desjacques, D. Pogosyan, J. Devriendt, A. Slyz, *Intrinsic alignment of simulated galaxies in the cosmic web: implications for weak lensing surveys*, Monthly Notices of the Royal Astronomical Society **448**, 3391 (2015), arXiv:1406.4668.
- (Coelho, 1988) P. Coelho, *The Alchemist* (HarperTorch, 1988).
- (Colberg *et al.*, 2005) J. M. Colberg, R. K. Sheth, A. Diaferio, L. Gao, N. Yoshida, *Voids in a Λ CDM universe*, Monthly Notices of the Royal Astronomical Society **360**, 216 (2005), astro-ph/0409162.
- (Colberg *et al.*, 2008) J. M. Colberg, F. Pearce, C. Foster, E. Platen, R. Brunino, M. Neyrinck, S. Basilakos, A. Fairall, H. Feldman, S. Gottlöber, O. Hahn, F. Hoyle, V. Müller, L. Nelson, M. Plionis, C. Porciani, S. Shandarin, M. S. Vogeley, R. van de Weygaert, *The Aspen-Amsterdam void finder comparison project*, Monthly Notices of the Royal Astronomical Society **387**, 933 (2008), arXiv:0803.0918.
- (Cole & Kaiser, 1989) S. Cole, N. Kaiser, *Biased clustering in the cold dark matter cosmogony*, Monthly Notices of the Royal Astronomical Society **237**, 1127 (1989).
- (Cole *et al.*, 2005) S. Cole, W. J. Percival, J. A. Peacock, P. Norberg, C. M. Baugh, C. S. Frenk, I. Baldry, J. Bland-Hawthorn, T. Bridges, R. Cannon, M. Colless, C. Collins, W. Couch, N. J. G. Cross, G. Dalton, V. R. Eke, R. De Propris, S. P. Driver, G. Efstathiou, R. S. Ellis, K. Glazebrook, C. Jackson, A. Jenkins, O. Lahav, I. Lewis, S. Lumsden, S. Maddox, D. Madgwick, B. A. Peterson, W. Sutherland, K. Taylor, *The 2dF Galaxy Redshift Survey: power-spectrum analysis of the final data set and cosmological implications*, Monthly Notices of the Royal Astronomical Society **362**, 505 (2005), astro-ph/0501174.
- (Coles & Jones, 1991) P. Coles, B. Jones, *A lognormal model for the cosmological mass distribution*, Monthly Notices of the Royal Astronomical Society **248**, 1 (1991).
- (Coles, Melott & Shandarin, 1993) P. Coles, A. L. Melott, S. F. Shandarin, *Testing approximations for non-linear gravitational clustering*, Monthly Notices of the Royal Astronomical Society **260**, 765 (1993).
- (Colless *et al.*, 2003) M. Colless, B. A. Peterson, C. Jackson, J. A. Peacock, S. Cole, P. Norberg, I. K. Baldry, C. M. Baugh, J. Bland-Hawthorn, T. Bridges, R. Cannon, C. Collins, W. Couch, N. Cross, G. Dalton, R. De Propris, S. P. Driver, G. Efstathiou, R. S. Ellis, C. S. Frenk, K. Glazebrook, O. Lahav, I. Lewis, S. Lumsden, S. Maddox, D. Madgwick, W. Sutherland, K. Taylor, *The 2dF Galaxy Redshift Survey: Final Data Release*, ArXiv Astrophysics e-prints (2003), astro-ph/0306581.
- (Colombi, 1994) S. Colombi, *A 'skewed' lognormal approximation to the probability distribution function of the large-scale density field*, Astrophysical Journal **435**, 536 (1994), astro-ph/9402071.
- (Cooray & Sheth, 2002) A. Cooray, R. Sheth, *Halo models of large scale structure*, Physics Reports **372**, 1 (2002), arXiv:astro-ph/0206508.
- (Cox, 1946) R. T. Cox, *Probability, Frequency and Reasonable Expectation*, American Journal of Physics **14**, 1 (1946).
- (Crocce & Scoccimarro, 2006) M. Crocce, R. Scoccimarro, *Renormalized cosmological perturbation theory*, Physical Review D **73**, 063519 (2006), astro-ph/0509418.
- (Crocce, Pueblas & Scoccimarro, 2006a) M. Crocce, S. Pueblas, R. Scoccimarro, *Transients from initial conditions in cosmological simulations*, Monthly Notices of the Royal Astronomical Society **373**, 369 (2006a), astro-ph/0606505.

- (Crocce, Pueblas & Scoccimarro, 2006b) M. Crocce, S. Pueblas, R. Scoccimarro, *Transients from initial conditions in cosmological simulations*, Monthly Notices of the Royal Astronomical Society **373**, 369 (2006b), astro-ph/0606505.
- (Croft *et al.*, 1998) R. A. C. Croft, D. H. Weinberg, N. Katz, L. Hernquist, *Recovery of the Power Spectrum of Mass Fluctuations from Observations of the Ly alpha Forest*, Astrophysical Journal **495**, 44 (1998), arXiv:astro-ph/9708018.
- (Croft *et al.*, 1999) R. A. C. Croft, D. H. Weinberg, M. Pettini, L. Hernquist, N. Katz, *The Power Spectrum of Mass Fluctuations Measured from the LYalpha Forest at Redshift Z=2.5*, Astrophysical Journal **520**, 1 (1999), arXiv:astro-ph/9809401.
- (Dark Energy Survey Collaboration, 2005) Dark Energy Survey Collaboration, *The Dark Energy Survey*, ArXiv Astrophysics e-prints (2005), astro-ph/0510346.
- (Davis *et al.*, 1985) M. Davis, G. Efstathiou, C. S. Frenk, S. D. M. White, *The evolution of large-scale structure in a universe dominated by cold dark matter*, Astrophysical Journal **292**, 371 (1985).
- (Davis *et al.*, 2003) M. Davis, S. M. Faber, J. Newman, A. C. Phillips, R. S. Ellis, C. C. Steidel, C. Conselice, A. L. Coil, D. P. Finkbeiner, D. C. Koo, P. Guhathakurta, B. Weiner, R. Schiavon, C. Willmer, N. Kaiser, G. A. Luppino, G. Wirth, A. Connolly, P. Eisenhardt, M. Cooper, B. Gerke, *Science Objectives and Early Results of the DEEP2 Redshift Survey*, in *Discoveries and Research Prospects from 6- to 10-Meter-Class Telescopes II*, Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, Vol. 4834, edited by P. Guhathakurta (2003) pp. 161–172, astro-ph/0209419.
- (Davis *et al.*, 2007) M. Davis, P. Guhathakurta, N. P. Konidaris, J. A. Newman, M. L. N. Ashby, A. D. Biggs, P. Barmby, K. Bundy, S. C. Chapman, A. L. Coil, C. J. Conselice, M. C. Cooper, D. J. Croton, P. R. M. Eisenhardt, R. S. Ellis, S. M. Faber, T. Fang, G. G. Fazio, A. Georgakis, B. F. Gerke, W. M. Goss, S. Gwyn, J. Harker, A. M. Hopkins, J.-S. Huang, R. J. Ivison, S. A. Kassin, E. N. Kirby, A. M. Koekemoer, D. C. Koo, E. S. Laird, E. Le Floc'h, L. Lin, J. M. Lotz, P. J. Marshall, D. C. Martin, A. J. Metevier, L. A. Moustakas, K. Nandra, K. G. Noeske, C. Papovich, A. C. Phillips, R. M. Rich, G. H. Rieke, D. Rigopoulou, S. Salim, D. Schiminovich, L. Simard, I. Smail, T. A. Small, B. J. Weiner, C. N. A. Willmer, S. P. Willner, G. Wilson, E. L. Wright, R. Yan, *The All-Wavelength Extended Groth Strip International Survey (AEGIS) Data Sets*, Astrophysical Journal Letters **660**, L1 (2007), astro-ph/0607355.
- (de Lapparent, Geller & Huchra, 1986) V. de Lapparent, M. J. Geller, J. P. Huchra, *A slice of the universe*, Astrophysical Journal Letters **302**, L1 (1986).
- (Dickey, 1971) J. M. Dickey, *The weighted likelihood ratio, linear hypotheses on normal location parameters*, The Annals of Mathematical Statistics **42**, 204 (1971).
- (Doroshkevich, 1970a) A. G. Doroshkevich, *The space structure of perturbations and the origin of rotation of galaxies in the theory of fluctuation*, Astrofizika **6**, 581 (1970a).
- (Doroshkevich, 1970b) A. G. Doroshkevich, *Spatial structure of perturbations and origin of galactic rotation in fluctuation theory*, Astrophysics **6**, 320 (1970b).
- (Drinkwater *et al.*, 2010) M. J. Drinkwater, R. J. Jurek, C. Blake, D. Woods, K. A. Pimbblet, K. Glazebrook, R. Sharp, M. B. Pracy, S. Brough, M. Colless, W. J. Couch, S. M. Croom, T. M. Davis, D. Forbes, K. Forster, D. G. Gilbank, M. Gladders, B. Jelliffe, N. Jones, I.-H. Li, B. Madore, D. C. Martin, G. B. Poole, T. Small, E. Wisnioski, T. Wyder, H. K. C. Yee, *The WiggleZ Dark Energy Survey: survey design and first data release*, Monthly Notices of the Royal Astronomical Society **401**, 1429 (2010), arXiv:0911.4246.
- (Driver *et al.*, 2009) S. P. Driver, P. Norberg, I. K. Baldry, S. P. Bamford, A. M. Hopkins, J. Liske, J. Loveday, J. A. Peacock, D. T. Hill, L. S. Kelvin, A. S. G. Robotham, N. J. G. Cross, H. R. Parkinson, M. Prescott, C. J. Conselice, L. Dunne, S. Brough, H. Jones, R. G. Sharp, E. van Kampen, S. Oliver, I. G. Roseboom, J. Bland-Hawthorn, S. M. Croom, S. Ellis, E. Cameron, S. Cole, C. S. Frenk, W. J. Couch, A. W. Graham, R. Proctor, R. De Propris, I. F. Doyle, E. M. Edmondson, R. C. Nichol, D. Thomas, S. A. Eales, M. J. Jarvis, K. Kuijken, O. Lahav, B. F. Madore, M. Seibert, M. J. Meyer, L. Staveley-Smith, S. Phillipps, C. C. Popescu,

- A. E. Sansom, W. J. Sutherland, R. J. Tuffs, S. J. Warren, *GAMA: towards a physical understanding of galaxy formation*, *Astronomy and Geophysics* **50**, 12 (2009), arXiv:0910.5123 [astro-ph.CO].
- (Duane *et al.*, 1987) S. Duane, A. D. Kennedy, B. J. Pendleton, D. Roweth, *Hybrid Monte Carlo*, *Physics Letters B* **195**, 216 (1987).
- (Dubinski *et al.*, 1993) J. Dubinski, L. N. da Costa, D. S. Goldwirth, M. Lecar, T. Piran, *Void evolution and the large-scale structure*, *Astrophysical Journal* **410**, 458 (1993).
- (Dubois *et al.*, 2014) Y. Dubois, C. Pichon, C. Welker, D. Le Borgne, J. Devriendt, C. Laigle, S. Codis, D. Pogosyan, S. Arnouts, K. Benabed, E. Bertin, J. Blaizot, F. Bouchet, J.-F. Cardoso, S. Colombi, V. de Lapparent, V. Desjacques, R. Gavazzi, S. Kassin, T. Kimm, H. McCracken, B. Milliard, S. Peirani, S. Prunet, S. Roublerol, J. Silk, A. Slyz, T. Sousbie, R. Teyssier, L. Tresse, M. Treyer, D. Vibert, M. Volonteri, *Dancing in the dark: galactic properties trace spin swings along the cosmic web*, *Monthly Notices of the Royal Astronomical Society* **444**, 1453 (2014), arXiv:1402.1165.
- (Eardley *et al.*, 2015) E. Eardley, J. A. Peacock, T. McNaught-Roberts, C. Heymans, P. Norberg, M. Alpaslan, I. Baldry, J. Bland-Hawthorn, S. Brough, M. E. Cluver, S. P. Driver, D. J. Farrow, J. Liske, J. Loveday, A. S. G. Robotham, *Galaxy And Mass Assembly (GAMA): the galaxy luminosity function within the cosmic web*, *Monthly Notices of the Royal Astronomical Society* **448**, 3665 (2015), arXiv:1412.2141.
- (Efstathiou *et al.*, 1985) G. Efstathiou, M. Davis, S. D. M. White, C. S. Frenk, *Numerical techniques for large cosmological N-body simulations*, *Astrophysical Journal Supplement* **57**, 241 (1985).
- (Einstein & de Sitter, 1932) A. Einstein, W. de Sitter, *On the Relation between the Expansion and the Mean Density of the Universe*, *Proceedings of the National Academy of Science* **18**, 213 (1932).
- (Eisenstein & Hu, 1999) D. J. Eisenstein, W. Hu, *Power Spectra for Cold Dark Matter and Its Variants*, *Astrophysical Journal* **511**, 5 (1999), astro-ph/9710252.
- (Eisenstein & Hu, 1998) D. J. Eisenstein, W. Hu, *Baryonic Features in the Matter Transfer Function*, *Astrophysical Journal* **496**, 605 (1998), astro-ph/9709112.
- (Eisenstein *et al.*, 2007) D. J. Eisenstein, H.-J. Seo, E. Sirk, D. N. Spergel, *Improving Cosmological Distance Measurements by Reconstruction of the Baryon Acoustic Peak*, *Astrophysical Journal* **664**, 675 (2007), astro-ph/0604362.
- (Eisenstein *et al.*, 2005) D. J. Eisenstein, I. Zehavi, D. W. Hogg, R. Scoccimarro, M. R. Blanton, R. C. Nichol, R. Scranton, H.-J. Seo, M. Tegmark, Z. Zheng, S. F. Anderson, J. Annis, N. Bahcall, J. Brinkmann, S. Burles, F. J. Castander, A. Connolly, I. Csabai, M. Doi, M. Fukugita, J. A. Frieman, K. Glazebrook, J. E. Gunn, J. S. Hendry, G. Hennessy, Z. Ivezić, S. Kent, G. R. Knapp, H. Lin, Y.-S. Loh, R. H. Lupton, B. Margon, T. A. McKay, A. Meiksin, J. A. Munn, A. Pope, M. W. Richmond, D. Schlegel, D. P. Schneider, K. Shimasaku, C. Stoughton, M. A. Strauss, M. SubbaRao, A. S. Szalay, I. Szapudi, D. L. Tucker, B. Yanny, D. G. York, *Detection of the Baryon Acoustic Peak in the Large-Scale Correlation Function of SDSS Luminous Red Galaxies*, *Astrophysical Journal* **633**, 560 (2005), astro-ph/0501171.
- (Elsner & Wandelt, 2013) F. Elsner, B. D. Wandelt, *Efficient Wiener filtering without preconditioning*, *Astronomy and Astrophysics* **549**, A111 (2013), arXiv:1210.4931 [astro-ph.CO].
- (Elsner & Wandelt, 2010) F. Elsner, B. D. Wandelt, *Local Non-Gaussianity in the Cosmic Microwave Background the Bayesian Way*, *Astrophysical Journal* **724**, 1262 (2010), arXiv:1010.1254 [astro-ph.CO].
- (Elyiv *et al.*, 2015) A. Elyiv, F. Marulli, G. Pollina, M. Baldi, E. Branchini, A. Cimatti, L. Moscardini, *Cosmic voids detection without density measurements*, *Monthly Notices of the Royal Astronomical Society* **448**, 642 (2015), arXiv:1410.4559.
- (Erdoğdu *et al.*, 2004) P. Erdoğdu, O. Lahav, S. Zaroubi, G. Efstathiou, S. Moody, J. A. Peacock, M. Colless, I. K. Baldry, C. M. Baugh, J. Bland-Hawthorn, T. Bridges, R. Cannon, S. Cole, C. Collins, W. Couch, G. Dalton, R. De Propris, S. P. Driver, R. S. Ellis, C. S. Frenk, K. Glazebrook, C. Jackson, I. Lewis, S. Lumsden, S. Maddox, D. Madgwick, P. Norberg, B. A. Peterson, W. Sutherland, K. Taylor, *The 2dF*

- Galaxy Redshift Survey: Wiener reconstruction of the cosmic web*, Monthly Notices of the Royal Astronomical Society **352**, 939 (2004), astro-ph/0312546.
- (Eriksen *et al.*, 2004) H. K. Eriksen, I. J. O'Dwyer, J. B. Jewell, B. D. Wandelt, D. L. Larson, K. M. Górski, S. Levin, A. J. Banday, P. B. Lilje, *Power Spectrum Estimation from High-Resolution Maps by Gibbs Sampling*, Astrophysical Journal Supplement **155**, 227 (2004), astro-ph/0407028.
- (Falck, Neyrinck & Szalay, 2012) B. L. Falck, M. C. Neyrinck, A. S. Szalay, *ORIGAMI: Delineating Halos Using Phase-space Folds*, Astrophysical Journal **754**, 126 (2012), arXiv:1201.2353 [astro-ph.CO].
- (Falck, Koyama & Zhao, 2015) B. Falck, K. Koyama, G.-B. Zhao, *Cosmic web and environmental dependence of screening: Vainshtein vs. chameleon*, Journal of Cosmology and Astroparticle Physics **7**, 049 (2015), arXiv:1503.06673 [astro-ph.CO].
- (Fendt & Wandelt, 2007) W. A. Fendt, B. D. Wandelt, *Pico: Parameters for the Impatient Cosmologist*, Astrophysical Journal **654**, 2 (2007), astro-ph/0606709.
- (Feng & Fang, 2000) L.-L. Feng, L.-Z. Fang, *Non-Gaussianity and the Recovery of the Mass Power Spectrum from the Ly α Forest*, Astrophysical Journal **535**, 519 (2000), arXiv:astro-ph/0001348.
- (Fitzgerald, 1925) F. S. Fitzgerald, *The Great Gatsby* (Charles Scribner's Sons, 1925).
- (Forero-Romero & González, 2015) J. E. Forero-Romero, R. González, *The Local Group in the Cosmic Web*, Astrophysical Journal **799**, 45 (2015), arXiv:1408.3166.
- (Forero-Romero, Contreras & Padilla, 2014) J. E. Forero-Romero, S. Contreras, N. Padilla, *Cosmic web alignments with the shape, angular momentum and peculiar velocities of dark matter haloes*, Monthly Notices of the Royal Astronomical Society **443**, 1090 (2014), arXiv:1406.0508.
- (Forero-Romero *et al.*, 2009) J. E. Forero-Romero, Y. Hoffman, S. Gottlöber, A. Klypin, G. Yepes, *A dynamical classification of the cosmic web*, Monthly Notices of the Royal Astronomical Society **396**, 1815 (2009), arXiv:0809.4135 [astro-ph].
- (Furlanetto & Piran, 2006) S. R. Furlanetto, T. Piran, *The evidence of absence: galaxy voids in the excursion set formalism*, Monthly Notices of the Royal Astronomical Society **366**, 467 (2006), astro-ph/0509148.
- (Galassi *et al.*, 2003) M. Galassi, J. Davies, J. Theiler, B. Gough, G. Jungman, M. Booth, F. Rossi, *Gnu Scientific Library: Reference Manual* (Network Theory Ltd., 2003).
- (Gaztañaga & Yokoyama, 1993) E. Gaztañaga, J. Yokoyama, *Probing the statistics of primordial fluctuations and their evolution*, Astrophysical Journal **403**, 450 (1993).
- (Geller & Huchra, 1989) M. J. Geller, J. P. Huchra, *Mapping the universe*, Science **246**, 897 (1989).
- (Gelman & Rubin, 1992) A. Gelman, D. B. Rubin, *Inference from Iterative Simulation Using Multiple Sequences*, Statistical Science **7**, 457 (1992).
- (Gelman *et al.*, 2013) A. Gelman, J. B. Carlin, H. S. Stern, D. B. Dunson, A. Vehtari, D. B. Rubin, *Bayesian Data Analysis, Third Edition* (Taylor & Francis, 2013).
- (Gil-Marín *et al.*, 2012) H. Gil-Marín, C. Wagner, F. Fragkoudi, R. Jimenez, L. Verde, *An improved fitting formula for the dark matter bispectrum*, Journal of Cosmology and Astroparticle Physics **2**, 047 (2012), arXiv:1111.4477 [astro-ph.CO].
- (Gil-Marín *et al.*, 2011) H. Gil-Marín, F. Schmidt, W. Hu, R. Jimenez, L. Verde, *The bispectrum of f(R) cosmologies*, Journal of Cosmology and Astroparticle Physics **11**, 019 (2011), arXiv:1109.2115 [astro-ph.CO].
- (Goldberg & Vogeley, 2004) D. M. Goldberg, M. S. Vogeley, *Simulating Voids*, Astrophysical Journal **605**, 1 (2004), astro-ph/0307191.
- (Gott, Dickinson & Melott, 1986) J. R. Gott, III, M. Dickinson, A. L. Melott, *The sponge-like topology of large-scale structure in the universe*, Astrophysical Journal **306**, 341 (1986).

- ([Gott et al., 2005](#)) J. R. Gott, III, M. Jurić, D. Schlegel, F. Hoyle, M. Vogeley, M. Tegmark, N. Bahcall, J. Brinkmann, *A Map of the Universe*, *Astrophysical Journal* **624**, 463 (2005), astro-ph/0310571.
- ([Green et al., 2012](#)) J. Green, P. Schechter, C. Baltay, R. Bean, D. Bennett, R. Brown, C. Conselice, M. Donahue, X. Fan, B. S. Gaudi, C. Hirata, J. Kalirai, T. Lauer, B. Nichol, N. Padmanabhan, S. Perlmutter, B. Rauscher, J. Rhodes, T. Roellig, D. Stern, T. Sumi, A. Tanner, Y. Wang, D. Weinberg, E. Wright, N. Gehrels, R. Sambruna, W. Traub, J. Anderson, K. Cook, P. Garnavich, L. Hillenbrand, Z. Ivezić, E. Kerins, J. Lunine, P. McDonald, M. Penny, M. Phillips, G. Rieke, A. Riess, R. van der Marel, R. K. Barry, E. Cheng, D. Content, R. Cutri, R. Goullioud, K. Grady, G. Helou, C. Jackson, J. Kruk, M. Melton, C. Peddie, N. Rioux, M. Seiffert, *Wide-Field InfraRed Survey Telescope (WFIRST) Final Report*, ArXiv e-prints (2012), arXiv:1208.4012 [astro-ph.IM].
- ([Gregory & Thompson, 1978](#)) S. A. Gregory, L. A. Thompson, *The Coma/A1367 supercluster and its environs*, *Astrophysical Journal* **222**, 784 (1978).
- ([Gregory, Thompson & Tifft, 1981](#)) S. A. Gregory, L. A. Thompson, W. G. Tifft, *The Perseus supercluster*, *Astrophysical Journal* **243**, 411 (1981).
- ([Groth & Peebles, 1975](#)) E. J. Groth, P. J. E. Peebles, *Closed-form solutions for the evolution of density perturbations in some cosmological models*, *Astronomy and Astrophysics* **41**, 143 (1975).
- ([Gunn & Gott, 1972](#)) J. E. Gunn, J. R. Gott, III, *On the Infall of Matter Into Clusters of Galaxies and Some Effects on Their Evolution*, *Astrophysical Journal* **176**, 1 (1972).
- ([Gurbatov, Saichev & Shandarin, 1989](#)) S. N. Gurbatov, A. I. Saichev, S. F. Shandarin, *The large-scale structure of the universe in the frame of the model equation of non-linear diffusion*, *Monthly Notices of the Royal Astronomical Society* **236**, 385 (1989).
- ([Guth, 1981](#)) A. H. Guth, *Inflationary universe: A possible solution to the horizon and flatness problems*, *Physical Review D* **23**, 347 (1981).
- ([Guth & Pi, 1982](#)) A. H. Guth, S.-Y. Pi, *Fluctuations in the new inflationary universe*, *Physical Review Letters* **49**, 1110 (1982).
- ([Guzzo et al., 2014](#)) L. Guzzo, M. Scoggio, B. Garilli, B. R. Granett, A. Fritz, U. Abbas, C. Adami, S. Arnouts, J. Bel, M. Bolzonella, D. Bottini, E. Branchini, A. Cappi, J. Coupon, O. Cucciati, I. Davidzon, G. De Lucia, S. de la Torre, P. Franzetti, M. Fumana, P. Hudelot, O. Ilbert, A. Iovino, J. Krywult, V. Le Brun, O. Le Fèvre, D. Maccagni, K. Malek, F. Marulli, H. J. McCracken, L. Paioro, J. A. Peacock, M. Polletta, A. Pollo, H. Schlagenhauf, L. A. M. Tasca, R. Tojeiro, D. Vergani, G. Zamorani, A. Zanichelli, A. Burden, C. Di Porto, A. Marchetti, C. Marinoni, Y. Mellier, L. Moscardini, R. C. Nichol, W. J. Percival, S. Phleps, M. Wolk, *The VIMOS Public Extragalactic Redshift Survey (VIPERS). An unprecedented view of galaxies and large-scale structure at $0.5 < z < 1.2$* , *Astronomy and Astrophysics* **566**, A108 (2014), arXiv:1303.2623.
- ([Guzzo et al., 2008](#)) L. Guzzo, M. Pierleoni, B. Meneux, E. Branchini, O. Le Fèvre, C. Marinoni, B. Garilli, J. Blaizot, G. De Lucia, A. Pollo, H. J. McCracken, D. Bottini, V. Le Brun, D. Maccagni, J. P. Picat, R. Scaramella, M. Scoggio, L. Tresse, G. Vettolani, A. Zanichelli, C. Adami, S. Arnouts, S. Bardelli, M. Bolzonella, A. Bongiorno, A. Cappi, S. Charlot, P. Ciliegi, T. Contini, O. Cucciati, S. de la Torre, K. Dolag, S. Foucaud, P. Franzetti, I. Gavignaud, O. Ilbert, A. Iovino, F. Lamareille, B. Marano, A. Mazure, P. Memeo, R. Merighi, L. Moscardini, S. Paltani, R. Pellò, E. Perez-Montero, L. Pozzetti, M. Radovich, D. Vergani, G. Zamorani, E. Zucca, *A test of the nature of cosmic acceleration using galaxy redshift distortions*, *Nature* **451**, 541 (2008), arXiv:0802.1944.
- ([Hahn & Abel, 2011](#)) O. Hahn, T. Abel, *Multi-scale initial conditions for cosmological simulations*, *Monthly Notices of the Royal Astronomical Society* **415**, 2101 (2011), arXiv:1103.6031.
- ([Hahn, Angulo & Abel, 2015](#)) O. Hahn, R. E. Angulo, T. Abel, *The properties of cosmic velocity fields*, *Monthly Notices of the Royal Astronomical Society* **454**, 3920 (2015), arXiv:1404.2280.
- ([Hahn et al., 2007a](#)) O. Hahn, C. Porciani, C. M. Carollo, A. Dekel, *Properties of dark matter haloes in clusters, filaments, sheets and voids*, *Monthly Notices of the Royal Astronomical Society* **375**, 489 (2007a), astro-ph/0610280.

- (Hahn *et al.*, 2007b) O. Hahn, C. M. Carollo, C. Porciani, A. Dekel, *The evolution of dark matter halo properties in clusters, filaments, sheets and voids*, Monthly Notices of the Royal Astronomical Society **381**, 41 (2007b), arXiv:0704.2595.
- (Hahn *et al.*, 2009) O. Hahn, C. Porciani, A. Dekel, C. M. Carollo, *Tidal effects and the environment dependence of halo assembly*, Monthly Notices of the Royal Astronomical Society **398**, 1742 (2009), arXiv:0803.4211.
- (Hajian, 2007) A. Hajian, *Efficient cosmological parameter estimation with Hamiltonian MonteCarlo technique*, Physical Review D **75**, 083525 (2007), arXiv:astro-ph/0608679.
- (Hamaus, Sutter & Wandelt, 2014) N. Hamaus, P. M. Sutter, B. D. Wandelt, *Universal Density Profile for Cosmic Voids*, Physical Review Letters **112**, 251302 (2014), arXiv:1403.5499.
- (Hamaus *et al.*, 2014a) N. Hamaus, P. M. Sutter, G. Lavaux, B. D. Wandelt, *Testing cosmic geometry without dynamic distortions using voids*, Journal of Cosmology and Astroparticle Physics **12**, 013 (2014a), arXiv:1409.3580.
- (Hamaus *et al.*, 2014b) N. Hamaus, B. D. Wandelt, P. M. Sutter, G. Lavaux, M. S. Warren, *Cosmology with Void-Galaxy Correlations*, Physical Review Letters **112**, 041304 (2014b), arXiv:1307.2571 [astro-ph.CO].
- (Hawking, 1982) S. W. Hawking, *The development of irregularities in a single bubble inflationary universe*, Physics Letters B **115**, 295 (1982).
- (Hawkins *et al.*, 2003) E. Hawkins, S. Maddox, S. Cole, O. Lahav, D. S. Madgwick, P. Norberg, J. A. Peacock, I. K. Baldry, C. M. Baugh, J. Bland-Hawthorn, T. Bridges, R. Cannon, M. Colless, C. Collins, W. Couch, G. Dalton, R. De Propris, S. P. Driver, G. Efstathiou, R. S. Ellis, C. S. Frenk, K. Glazebrook, C. Jackson, B. Jones, I. Lewis, S. Lumsden, W. Percival, B. A. Peterson, W. Sutherland, K. Taylor, *The 2dF Galaxy Redshift Survey: correlation functions, peculiar velocities and the matter density of the Universe*, Monthly Notices of the Royal Astronomical Society **346**, 78 (2003), astro-ph/0212375.
- (Heath, 1977) D. J. Heath, *The growth of density perturbations in zero pressure Friedmann-Lemaitre universes*, Monthly Notices of the Royal Astronomical Society **179**, 351 (1977).
- (Heavens, 2009) A. F. Heavens, *Statistical techniques in cosmology*, ArXiv e-prints (2009), arXiv:0906.0664 [astro-ph.CO].
- (Heavens & Taylor, 1995) A. F. Heavens, A. N. Taylor, *A spherical harmonic analysis of redshift space*, Monthly Notices of the Royal Astronomical Society **275**, 483 (1995), astro-ph/9409027.
- (Heavens, Kitching & Verde, 2007) A. F. Heavens, T. D. Kitching, L. Verde, *On model selection forecasting, dark energy and modified gravity*, Monthly Notices of the Royal Astronomical Society **380**, 1029 (2007), astro-ph/0703191.
- (Heisenberg, Schäfer & Bartelmann, 2011) L. Heisenberg, B. M. Schäfer, M. Bartelmann, *A study of relative velocity statistics in Lagrangian perturbation theory with PINOCCHIO*, Monthly Notices of the Royal Astronomical Society **416**, 3057 (2011), arXiv:1011.1559 [astro-ph.CO].
- (Heitmann *et al.*, 2010) K. Heitmann, M. White, C. Wagner, S. Habib, D. Higdon, *The Coyote Universe. I. Precision Determination of the Nonlinear Matter Power Spectrum*, Astrophysical Journal **715**, 104 (2010), arXiv:0812.1052.
- (Heitmann *et al.*, 2009) K. Heitmann, D. Higdon, M. White, S. Habib, B. J. Williams, E. Lawrence, C. Wagner, *The Coyote Universe. II. Cosmological Models and Precision Emulation of the Nonlinear Matter Power Spectrum*, Astrophysical Journal **705**, 156 (2009), arXiv:0902.0429 [astro-ph.CO].
- (Hemans, 1826) F. Hemans, *Casabianca*, in *The New Monthly Magazine* (1826).
- (Heß, Kitaura & Gottlöber, 2013) S. Heß, F.-S. Kitaura, S. Gottlöber, *Simulating structure formation of the Local Universe*, Monthly Notices of the Royal Astronomical Society **435**, 2065 (2013), arXiv:1304.6565 [astro-ph.CO].

- (Hidding *et al.*, 2012) J. Hidding, R. van de Weygaert, G. Vegter, B. J. T. Jones, *Adhesion and the Geometry of the Cosmic Web* (2012) arXiv:1211.5385 [astro-ph.CO].
- (Hill *et al.*, 2008) G. J. Hill, K. Gebhardt, E. Komatsu, N. Drory, P. J. MacQueen, J. Adams, G. A. Blanc, R. Koehler, M. Rafal, M. M. Roth, A. Kelz, C. Gronwall, R. Ciardullo, D. P. Schneider, *The Hobby-Eberly Telescope Dark Energy Experiment (HETDEX): Description and Early Pilot Survey Results*, in *Panoramic Views of Galaxy Formation and Evolution*, Astronomical Society of the Pacific Conference Series, Vol. 399, edited by T. Kodama, T. Yamada, K. Aoki (2008) p. 115, arXiv:0806.0183.
- (Ho & Pepyne, 2002) Y. C. Ho, D. L. Pepyne, *Simple Explanation of the No-Free-Lunch Theorem and Its Implications*, Journal of Optimization Theory and Applications **115**, 549 (2002).
- (Hobson, 2010) M. P. Hobson, *Bayesian Methods in Cosmology*, edited by M. P. Hobson, A. H. Jaffe, A. R. Liddle, P. Mukherjee, D. Parkinson (Cambridge University Press, 2010).
- (Hockney & Eastwood, 1981) R. W. Hockney, J. W. Eastwood, *Computer Simulation Using Particles* (McGraw-Hill, 1981).
- (Hoffman & Ribak, 1991) Y. Hoffman, E. Ribak, *Constrained realizations of Gaussian fields - A simple algorithm*, Astrophysical Journal Letters **380**, L5 (1991).
- (Hoffman *et al.*, 2012) Y. Hoffman, O. Metuki, G. Yepes, S. Gottlöber, J. E. Forero-Romero, N. I. Libeskind, A. Knebe, *A kinematic classification of the cosmic web*, Monthly Notices of the Royal Astronomical Society **425**, 2049 (2012), arXiv:1201.3367 [astro-ph.CO].
- (Hubble, 1934) E. Hubble, *The Distribution of Extra-Galactic Nebulae*, Astrophysical Journal **79**, 8 (1934).
- (Huchra *et al.*, 2012) J. P. Huchra, L. M. Macri, K. L. Masters, T. H. Jarrett, P. Berlind, M. Calkins, A. C. Crook, R. Cutri, P. Erdoğdu, E. Falco, T. George, C. M. Hutcheson, O. Lahav, J. Mader, J. D. Mink, N. Martimbeau, S. Schneider, M. Skrutskie, S. Tokarz, M. Westover, *The 2MASS Redshift Survey – Description and Data Release*, Astrophysical Journal Supplement **199**, 26 (2012), arXiv:1108.0669 [astro-ph.CO].
- (Hugo, 1856) V. Hugo, *Les Contemplations* (1856).
- (Hui & Bertschinger, 1996) L. Hui, E. Bertschinger, *Local Approximations to the Gravitational Collapse of Cold Matter*, Astrophysical Journal **471**, 1 (1996), arXiv:astro-ph/9508114.
- (Icke, 1984) V. Icke, *Voids and filaments*, Monthly Notices of the Royal Astronomical Society **206**, 1P (1984).
- (Ilić, Langer & Doussis, 2013) S. Ilić, M. Langer, M. Doussis, *Detecting the integrated Sachs-Wolfe effect with stacked voids*, Astronomy and Astrophysics **556**, A51 (2013), arXiv:1301.5849 [astro-ph.CO].
- (Jasche & Lavaux, 2015) J. Jasche, G. Lavaux, *Matrix-free large-scale Bayesian inference in cosmology*, Monthly Notices of the Royal Astronomical Society **447**, 1204 (2015), arXiv:1402.1763.
- (Jasche & Wandelt, 2013a) J. Jasche, B. D. Wandelt, *Bayesian physical reconstruction of initial conditions from large-scale structure surveys*, Monthly Notices of the Royal Astronomical Society **432**, 894 (2013a), arXiv:1203.3639 [astro-ph.CO].
- (Jasche & Kitaura, 2010) J. Jasche, F. S. Kitaura, *Fast Hamiltonian sampling for large-scale structure inference*, Monthly Notices of the Royal Astronomical Society **407**, 29 (2010), arXiv:0911.2496 [astro-ph.CO].
- (Jasche & Wandelt, 2012) J. Jasche, B. D. Wandelt, *Bayesian inference from photometric redshift surveys*, Monthly Notices of the Royal Astronomical Society **425**, 1042 (2012), arXiv:1106.2757 [astro-ph.CO].
- (Jasche & Wandelt, 2013b) J. Jasche, B. D. Wandelt, *Methods for Bayesian Power Spectrum Inference with Galaxy Surveys*, Astrophysical Journal **779**, 15 (2013b), arXiv:1306.1821 [astro-ph.CO].
- (Jasche, Leclercq & Wandelt, 2015) J. Jasche, F. Leclercq, B. D. Wandelt, *Past and present cosmic structure in the SDSS DR7 main sample*, Journal of Cosmology and Astroparticle Physics **1**, 036 (2015), arXiv:1409.6308 [astro-ph.CO].

- ([Jasche et al., 2010a](#)) J. Jasche, F. S. Kitaura, B. D. Wandelt, T. A. Enßlin, *Bayesian power-spectrum inference for large-scale structure data*, *Monthly Notices of the Royal Astronomical Society* **406**, 60 (2010a), arXiv:0911.2493 [astro-ph.CO].
- ([Jasche et al., 2010b](#)) J. Jasche, F. S. Kitaura, C. Li, T. A. Enßlin, *Bayesian non-linear large-scale structure inference of the Sloan Digital Sky Survey Data Release 7*, *Monthly Notices of the Royal Astronomical Society* **409**, 355 (2010b), arXiv:0911.2498 [astro-ph.CO].
- ([Jaynes, 2003](#)) E. T. Jaynes, *Probability Theory: The Logic of Science*, edited by G. L. Bretthorst (Cambridge University Press, 2003).
- ([Jennings, Li & Hu, 2013](#)) E. Jennings, Y. Li, W. Hu, *The abundance of voids and the excursion set formalism*, *Monthly Notices of the Royal Astronomical Society* **434**, 2167 (2013), arXiv:1304.6087.
- ([Jeong & Komatsu, 2009](#)) D. Jeong, E. Komatsu, *Primordial Non-Gaussianity, Scale-dependent Bias, and the Bispectrum of Galaxies*, *Astrophysical Journal* **703**, 1230 (2009), arXiv:0904.0497 [astro-ph.CO].
- ([Jewell et al., 2009](#)) J. B. Jewell, H. K. Eriksen, B. D. Wandelt, I. J. O'Dwyer, G. Huey, K. M. Górski, *A Markov Chain Monte Carlo Algorithm for Analysis of Low Signal-To-Noise Cosmic Microwave Background Data*, *Astrophysical Journal* **697**, 258 (2009), arXiv:0807.0624.
- ([Jewell, Levin & Anderson, 2004](#)) J. Jewell, S. Levin, C. H. Anderson, *Application of Monte Carlo Algorithms to the Bayesian Analysis of the Cosmic Microwave Background*, *Astrophysical Journal* **609**, 1 (2004), astro-ph/0209560.
- ([Jing, 2005](#)) Y. P. Jing, *Correcting for the Alias Effect When Measuring the Power Spectrum Using a Fast Fourier Transform*, *Astrophysical Journal* **620**, 559 (2005), astro-ph/0409240.
- ([Jones, van de Weygaert & Aragón-Calvo, 2010](#)) B. J. T. Jones, R. van de Weygaert, M. A. Aragón-Calvo, *Fossil evidence for spin alignment of Sloan Digital Sky Survey galaxies in filaments*, *Monthly Notices of the Royal Astronomical Society* **408**, 897 (2010), arXiv:1001.4479 [astro-ph.CO].
- ([Kaiser, 1987](#)) N. Kaiser, *Clustering in real space and in redshift space*, *Monthly Notices of the Royal Astronomical Society* **227**, 1 (1987).
- ([Kayo, Taruya & Suto, 2001](#)) I. Kayo, A. Taruya, Y. Suto, *Probability Distribution Function of Cosmological Density Fluctuations from a Gaussian Initial Condition: Comparison of One-Point and Two-Point Lognormal Model Predictions with N-Body Simulations*, *Astrophysical Journal* **561**, 22 (2001), arXiv:astro-ph/0105218.
- ([Kendall & Stuart, 1968](#)) M. G. Kendall, A. Stuart, *The advanced theory of statistics* (Griffin, 1968).
- ([Kirshner et al., 1981](#)) R. P. Kirshner, A. Oemler, Jr., P. L. Schechter, S. A. Shectman, *A million cubic megaparsec void in Bootes*, *Astrophysical Journal Letters* **248**, L57 (1981).
- ([Kitaura, 2012](#)) F.-S. Kitaura, *Bayesian Analysis of Cosmic Structures*, in *Astrostatistics and Data Mining*, edited by L. M. Sarro, L. Eyer, W. O'Mullane, J. De Ridder (2012) p. 143.
- ([Kitaura, 2013](#)) F.-S. Kitaura, *The initial conditions of the Universe from constrained simulations*, *Monthly Notices of the Royal Astronomical Society* **429**, L84 (2013), arXiv:1203.4184 [astro-ph.CO].
- ([Kitaura & Heß, 2013](#)) F.-S. Kitaura, S. Heß, *Cosmological structure formation with augmented Lagrangian perturbation theory*, *Monthly Notices of the Royal Astronomical Society* **435**, L78 (2013), arXiv:1212.3514 [astro-ph.CO].
- ([Kitaura & Enßlin, 2008](#)) F. S. Kitaura, T. A. Enßlin, *Bayesian reconstruction of the cosmological large-scale structure: methodology, inverse algorithms and numerical optimization*, *Monthly Notices of the Royal Astronomical Society* **389**, 497 (2008), arXiv:0705.0429 [astro-ph].
- ([Kitaura, Gallerani & Ferrara, 2012](#)) F.-S. Kitaura, S. Gallerani, A. Ferrara, *Multiscale inference of matter fields and baryon acoustic oscillations from the Ly α forest*, *Monthly Notices of the Royal Astronomical Society* **420**, 61 (2012), arXiv:1011.6233 [astro-ph.CO].

- ([Kitaura, Jasche & Metcalf, 2010](#)) F.-S. Kitaura, J. Jasche, R. B. Metcalf, *Recovering the non-linear density field from the galaxy distribution with a Poisson-lognormal filter*, Monthly Notices of the Royal Astronomical Society **403**, 589 (2010), arXiv:0911.1407 [astro-ph.CO].
- ([Kitaura et al., 2009](#)) F. S. Kitaura, J. Jasche, C. Li, T. A. Enßlin, R. B. Metcalf, B. D. Wandelt, G. Lemson, S. D. M. White, *Cosmic cartography of the large-scale structure with Sloan Digital Sky Survey data release 6*, Monthly Notices of the Royal Astronomical Society **400**, 183 (2009), arXiv:0906.3978 [astro-ph.CO].
- ([Klypin & Shandarin, 1983](#)) A. A. Klypin, S. F. Shandarin, *Three-dimensional numerical model of the formation of large-scale structure in the Universe*, Monthly Notices of the Royal Astronomical Society **204**, 891 (1983).
- ([Kofman & Shandarin, 1988](#)) L. A. Kofman, S. F. Shandarin, *Theory of adhesion for the large-scale structure of the universe*, Nature **334**, 129 (1988).
- ([Kofman et al., 1992](#)) L. Kofman, D. Pogosyan, S. F. Shandarin, A. L. Melott, *Coherent structures in the universe and the adhesion model*, Astrophysical Journal **393**, 437 (1992).
- ([Kolb & Turner, 1990](#)) E. W. Kolb, M. S. Turner, *Front. Phys.*, Vol. 69, (Westview Press, 1990).
- ([Komatsu et al., 2011](#)) E. Komatsu, K. M. Smith, J. Dunkley, C. L. Bennett, B. Gold, G. Hinshaw, N. Jarosik, D. Larson, M. R. Nolta, L. Page, D. N. Spergel, M. Halpern, R. S. Hill, A. Kogut, M. Limon, S. S. Meyer, N. Odegard, G. S. Tucker, J. L. Weiland, E. Wollack, E. L. Wright, *Seven-year Wilkinson Microwave Anisotropy Probe (WMAP) Observations: Cosmological Interpretation*, Astrophysical Journal Supplement **192**, 18 (2011), arXiv:1001.4538 [astro-ph.CO].
- ([Kovač et al., 2014](#)) K. Kovač, S. J. Lilly, C. Knobel, T. J. Bschorr, Y. Peng, C. M. Carollo, T. Contini, J.-P. Kneib, O. Le Févre, V. Mainieri, A. Renzini, M. Scudeggio, G. Zamorani, S. Bardelli, M. Bolzonella, A. Bongiorno, K. Caputi, O. Cucciati, S. de la Torre, L. de Ravel, P. Franzetti, B. Garilli, A. Iovino, P. Kampczyk, F. Lamareille, J.-F. Le Borgne, V. Le Brun, C. Maier, M. Mignoli, P. Oesch, R. Pello, E. P. Montero, V. Presotto, J. Silverman, M. Tanaka, L. Tasca, L. Tresse, D. Vergani, E. Zucca, H. Aussel, A. M. Koekemoer, E. Le Floc'h, M. Moresco, L. Pozzetti, *zCOSMOS 20k: satellite galaxies are the main drivers of environmental effects in the galaxy population at least to $z \sim 0.7$* , Monthly Notices of the Royal Astronomical Society **438**, 717 (2014), arXiv:1307.4402 [astro-ph.CO].
- ([Kravtsov, 2002](#)) A. Kravtsov, *Writing a PM code* (2002).
- ([Kullback & Leibler, 1951](#)) S. Kullback, R. A. Leibler, *On Information and Sufficiency*, The Annals of Mathematical Statistics **22**, 79 (1951).
- ([Lahav & Suto, 2004](#)) O. Lahav, Y. Suto, *Measuring our Universe from Galaxy Redshift Surveys*, Living Reviews in Relativity **7**, 8 (2004), arXiv:astro-ph/0310642.
- ([Lahav et al., 1991](#)) O. Lahav, P. B. Lilje, J. R. Primack, M. J. Rees, *Dynamical effects of the cosmological constant*, Monthly Notices of the Royal Astronomical Society **251**, 128 (1991).
- ([Lahav et al., 1994](#)) O. Lahav, K. B. Fisher, Y. Hoffman, C. A. Scharf, S. Zaroubi, *Wiener Reconstruction of All-Sky Galaxy Surveys in Spherical Harmonics*, Astrophysical Journal Letters **423**, L93 (1994), astro-ph/9311059.
- ([Laigle et al., 2015](#)) C. Laigle, C. Pichon, S. Codis, Y. Dubois, D. Le Borgne, D. Pogosyan, J. Devriendt, S. Peirani, S. Prunet, S. Roubenol, A. Slyz, T. Sousbie, *Swirling around filaments: are large-scale structure vortices spinning up dark haloes?*, Monthly Notices of the Royal Astronomical Society **446**, 2744 (2015), arXiv:1310.3801.
- ([Langlois, 2005](#)) D. Langlois, *Inflation, Quantum Fluctuations and Cosmological Perturbations*, in *NATO ASI B Proc. 188: Particle Physics and Cosmology: the Interface*, edited by D. Kazakov, G. Smadja (2005) p. 235, arXiv:hep-th/0405053.
- ([Langlois, 2010](#)) D. Langlois, *Inflation and Cosmological Perturbations*, in *Lectures on Cosmology Accelerated Expansion of the Universe by Georg Wolschin, Lecture Notes in Physics vol. 800, Springer Berlin / Heidelberg, ISSN 1616-6361; ISBN 978-3-642-10597-5, pp.1-57*, Vol. 800, edited by G. Wolschin (2010) pp. 1–57, arXiv:1001.5259 [astro-ph.CO].

- (Lavaux, 2008) G. Lavaux, *Reconstruction of peculiar velocities of galaxies: methods and applications to observations*, Ph.D. thesis, Institut d’Astrophysique de Paris, UMR 7095 CNRS – Université Pierre et Marie Curie – Paris 6 (2008).
- (Lavaux, 2010) G. Lavaux, *Precision constrained simulation of the local Universe*, Monthly Notices of the Royal Astronomical Society **406**, 1007 (2010), arXiv:0912.3525.
- (Lavaux & Jasche, 2016) G. Lavaux, J. Jasche, *Unmasking the masked Universe: the 2M++ catalogue through Bayesian eyes*, Monthly Notices of the Royal Astronomical Society **455**, 3169 (2016), arXiv:1509.05040 [astro-ph.CO].
- (Lavaux & Wandelt, 2010) G. Lavaux, B. D. Wandelt, *Precision cosmology with voids: definition, methods, dynamics*, Monthly Notices of the Royal Astronomical Society **403**, 1392 (2010), arXiv:0906.4101 [astro-ph.CO].
- (Lavaux & Wandelt, 2012) G. Lavaux, B. D. Wandelt, *Precision Cosmography with Stacked Voids*, Astrophysical Journal **754**, 109 (2012), arXiv:1110.0345 [astro-ph.CO].
- (Lavaux & Hudson, 2011) G. Lavaux, M. J. Hudson, *The 2M++ galaxy redshift catalogue*, Monthly Notices of the Royal Astronomical Society **416**, 2840 (2011), arXiv:1105.6107.
- (Lawrence *et al.*, 2010) E. Lawrence, K. Heitmann, M. White, D. Higdon, C. Wagner, S. Habib, B. Williams, *The Coyote Universe. III. Simulation Suite and Precision Emulator for the Nonlinear Matter Power Spectrum*, Astrophysical Journal **713**, 1322 (2010), arXiv:0912.4490 [astro-ph.CO].
- (Layzer, 1956) D. Layzer, *A new model for the distribution of galaxies in space*, Astronomical Journal **61**, 383 (1956).
- (Le Fèvre *et al.*, 2005) O. Le Fèvre, G. Vettolani, B. Garilli, L. Tresse, D. Bottini, V. Le Brun, D. Maccagni, J. P. Picat, R. Scaramella, M. Scoggio, A. Zanichelli, C. Adami, M. Arnaboldi, S. Arnouts, S. Bardelli, M. Bolzonella, A. Cappi, S. Charlot, P. Ciliegi, T. Contini, S. Foucaud, P. Franzetti, I. Gavignaud, L. Guzzo, O. Ilbert, A. Iovino, H. J. McCracken, B. Marano, C. Marinoni, G. Mathez, A. Mazure, B. Meneux, R. Merighi, S. Paltani, R. Pellò, A. Pollo, L. Pozzetti, M. Radovich, G. Zamorani, E. Zucca, M. Bondi, A. Bongiorno, G. Busarello, F. Lamareille, Y. Mellier, P. Merluzzi, V. Ripepi, D. Rizzo, *The VIMOS VLT deep survey. First epoch VVDS-deep survey: 11 564 spectra with $17.5 \leq i_{AB} \leq 24$, and the redshift distribution over $0 \leq z \leq 5$* , Astronomy and Astrophysics **439**, 845 (2005), astro-ph/0409133.
- (Le Fèvre *et al.*, 2013) O. Le Fèvre, P. Cassata, O. Cucciati, B. Garilli, O. Ilbert, V. Le Brun, D. Maccagni, C. Moreau, M. Scoggio, L. Tresse, G. Zamorani, C. Adami, S. Arnouts, S. Bardelli, M. Bolzonella, M. Bondi, A. Bongiorno, D. Bottini, A. Cappi, S. Charlot, P. Ciliegi, T. Contini, S. de la Torre, S. Foucaud, P. Franzetti, I. Gavignaud, L. Guzzo, A. Iovino, B. Lemaux, C. López-Sanjuan, H. J. McCracken, B. Marano, C. Marinoni, A. Mazure, Y. Mellier, R. Merighi, P. Merluzzi, S. Paltani, R. Pellò, A. Pollo, L. Pozzetti, R. Scaramella, L. Tasca, D. Vergani, G. Vettolani, A. Zanichelli, E. Zucca, *The VIMOS VLT Deep Survey final data release: a spectroscopic sample of 35 016 galaxies and AGN out to $z \sim 6.7$ selected with $17.5 \leq i_{AB} \leq 24.75$* , Astronomy and Astrophysics **559**, A14 (2013), arXiv:1307.0545.
- (Leclercq, Pisani & Wandelt, 2014) F. Leclercq, A. Pisani, B. D. Wandelt, *Cosmology: from theory to data, from data to theory*, in *New horizons for observational cosmology*, Proceedings of the International School of Physics “Enrico Fermi”, Vol. 186, edited by A. Cooray, A. Melchiorri, E. Komatsu, L. Lamagna (2014) pp. 189–233, arXiv:1403.1260 [astro-ph.CO].
- (Leclercq, Jasche & Wandelt, 2015a) F. Leclercq, J. Jasche, B. Wandelt, *Cosmic web-type classification using decision theory*, Astronomy and Astrophysics **576**, L17 (2015a), arXiv:1503.00730 [astro-ph.CO].
- (Leclercq, Jasche & Wandelt, 2015b) F. Leclercq, J. Jasche, B. Wandelt, *One-point statistics of the Lagrangian displacement field*, Journal of Cosmology and Astroparticle Physics **4**, 026 (2015b), arXiv:1507.08664 [astro-ph.CO].
- (Leclercq, Jasche & Wandelt, 2015c) F. Leclercq, J. Jasche, B. Wandelt, *Bayesian analysis of the dynamic cosmic web in the SDSS galaxy survey*, Journal of Cosmology and Astroparticle Physics **6**, 015 (2015c), arXiv:1502.02690 [astro-ph.CO].

- (Leclercq *et al.*, 2013) F. Leclercq, J. Jasche, H. Gil-Marín, B. Wandelt, *One-point remapping of Lagrangian perturbation theory in the mildly non-linear regime of cosmic structure formation*, *Journal of Cosmology and Astroparticle Physics* **11**, 048 (2013), arXiv:1305.4642 [astro-ph.CO].
- (Leclercq *et al.*, 2015) F. Leclercq, J. Jasche, P. M. Sutter, N. Hamaus, B. Wandelt, *Dark matter voids in the SDSS galaxy survey*, *Journal of Cosmology and Astroparticle Physics* **3**, 047 (2015), arXiv:1410.0355 [astro-ph.CO].
- (Lee & Li, 2008) J. Lee, C. Li, *Connecting the Physical Properties of Galaxies with the Overdensity and Tidal Shear of the Large-Scale Environment*, ArXiv e-prints (2008), arXiv:0803.1759.
- (Lee & Park, 2006) J. Lee, D. Park, *Rotation of Cosmic Voids and Void Spin Statistics*, *Astrophysical Journal* **652**, 1 (2006), astro-ph/0606477.
- (Lee & Lee, 2008) J. Lee, B. Lee, *The Variation of Galaxy Morphological Type with Environmental Shear*, *Astrophysical Journal* **688**, 78 (2008), arXiv:0801.1558.
- (Lee, Rey & Kim, 2014) J. Lee, S. C. Rey, S. Kim, *Alignments of the Galaxies in and around the Virgo Cluster with the Local Velocity Shear*, *Astrophysical Journal* **791**, 15 (2014), arXiv:1406.5250.
- (Lesgourges, 2011) J. Lesgourges, *The Cosmic Linear Anisotropy Solving System (CLASS) I: Overview*, ArXiv e-prints (2011), arXiv:1104.2932 [astro-ph.IM].
- (Lesgourges, 2004) J. Lesgourges, *An overview of Cosmology*, ArXiv Astrophysics e-prints (2004), astro-ph/0409426.
- (Levi *et al.*, 2013) M. Levi, C. Bebek, T. Beers, R. Blum, R. Cahn, D. Eisenstein, B. Flaugher, K. Honscheid, R. Kron, O. Lahav, P. McDonald, N. Roe, D. Schlegel, representing the DESI collaboration, *The DESI Experiment, a whitepaper for Snowmass 2013*, ArXiv e-prints (2013), arXiv:1308.0847 [astro-ph.CO].
- (Lewis & Challinor, 2002) A. Lewis, A. Challinor, *Evolution of cosmological dark matter perturbations*, *Physical Review D* **66**, 023531 (2002), astro-ph/0203507.
- (Lewis & Bridle, 2002) A. Lewis, S. Bridle, *Cosmological parameters from CMB and other data: A Monte Carlo approach*, *Physical Review D* **66**, 103511 (2002), arXiv:astro-ph/0205436.
- (Lewis, 1955) C. S. Lewis, *The Chronicles of Narnia, The Magician's Nephew* (The Bodley Head, 1955).
- (Li & Zhao, 2009) B. Li, H. Zhao, *Structure formation by a fifth force: N-body versus linear simulations*, *Physical Review D* **80**, 044027 (2009), arXiv:0906.3880 [astro-ph.CO].
- (Li, Zhao & Koyama, 2012) B. Li, G.-B. Zhao, K. Koyama, *Haloes and voids in $f(R)$ gravity*, *Monthly Notices of the Royal Astronomical Society* **421**, 3481 (2012), arXiv:1111.2602 [astro-ph.CO].
- (Li *et al.*, 2014) M. Li, R. E. Angulo, S. D. M. White, J. Jasche, *Matched filter optimization of kSZ measurements with a reconstructed cosmological flow field*, *Monthly Notices of the Royal Astronomical Society* **443**, 2311 (2014), arXiv:1404.0007.
- (Libeskind, Hoffman & Gottlöber, 2014) N. I. Libeskind, Y. Hoffman, S. Gottlöber, *The velocity shear and vorticity across redshifts and non-linear scales*, *Monthly Notices of the Royal Astronomical Society* **441**, 1974 (2014), arXiv:1310.5706.
- (Libeskind *et al.*, 2013) N. I. Libeskind, Y. Hoffman, J. Forero-Romero, S. Gottlöber, A. Knebe, M. Steinmetz, A. Klypin, *The velocity shear tensor: tracer of halo alignment*, *Monthly Notices of the Royal Astronomical Society* **428**, 2489 (2013), arXiv:1210.4559 [astro-ph.CO].
- (Liddle & Lyth, 2000) A. R. Liddle, D. H. Lyth, *Cosmological Inflation and Large-Scale Structure*, by Andrew R. Liddle and David H. Lyth, pp. 414. ISBN 052166022X. Cambridge, UK: Cambridge University Press, April 2000. (Cambridge University Press, 2000).
- (Lidz *et al.*, 2007) A. Lidz, O. Zahn, M. McQuinn, M. Zaldarriaga, S. Dutta, L. Hernquist, *Higher Order Contributions to the 21 cm Power Spectrum*, *Astrophysical Journal* **659**, 865 (2007), astro-ph/0610054.

- (Lightman & Schechter, 1990) A. P. Lightman, P. L. Schechter, *The Omega dependence of peculiar velocities induced by spherical density perturbations*, *Astrophysical Journal Supplement* **74**, 831 (1990).
- (Lilly *et al.*, 2007) S. J. Lilly, O. Le Fèvre, A. Renzini, G. Zamorani, M. Scoggio, T. Contini, C. M. Carollo, G. Hasinger, J.-P. Kneib, A. Iovino, V. Le Brun, C. Maier, V. Mainieri, M. Mignoli, J. Silverman, L. A. M. Tasca, M. Bolzonella, A. Bongiorno, D. Bottini, P. Capak, K. Caputi, A. Cimatti, O. Cucciati, E. Daddi, R. Feldmann, P. Franzetti, B. Garilli, L. Guzzo, O. Ilbert, P. Kampczyk, K. Kovac, F. Lamareille, A. Leauthaud, J.-F. L. Borgne, H. J. McCracken, C. Marinoni, R. Pello, E. Ricciardelli, C. Scarlata, D. Vergani, D. B. Sanders, E. Schinnerer, N. Scoville, Y. Taniguchi, S. Arnouts, H. Aussel, S. Bardelli, M. Brusa, A. Cappi, P. Ciliegi, A. Finoguenov, S. Foucaud, A. Franceschini, C. Halliday, C. Impey, C. Knobel, A. Koekemoer, J. Kurk, D. Maccagni, S. Maddox, B. Marano, G. Marconi, B. Meneux, B. Mobasher, C. Moreau, J. A. Peacock, C. Porciani, L. Pozzetti, R. Scaramella, D. Schiminovich, P. Shopbell, I. Smail, D. Thompson, L. Tresse, G. Vettolani, A. Zanichelli, E. Zucca, *zCOSMOS: A Large VLT/VIMOS Redshift Survey Covering $0 < z < 3$ in the COSMOS Field*, *Astrophysical Journal Supplement* **172**, 70 (2007), astro-ph/0612291.
- (Lin & Kilbinger, 2015) C.-A. Lin, M. Kilbinger, *A new model to predict weak-lensing peak counts. II. Parameter constraint strategies*, *Astronomy and Astrophysics* **583**, A70 (2015), arXiv:1506.01076.
- (Linde, 1995) A. Linde, *Lectures on inflationary cosmology.*, in *Particle Physics and Cosmology*, edited by A. Astbury, B. A. Campbell, W. Israel, F. C. Khanna, D. Page, J. L. Pinfield (1995) p. 72, arXiv:hep-th/9410082.
- (Linde, 1982) A. D. Linde, *A new inflationary universe scenario: A possible solution of the horizon, flatness, homogeneity, isotropy and primordial monopole problems*, *Physics Letters B* **108**, 389 (1982).
- (Little & Weinberg, 1994) B. Little, D. H. Weinberg, *Cosmic Voids and Biased Galaxy Formation*, *Monthly Notices of the Royal Astronomical Society* **267**, 605 (1994), astro-ph/9306006.
- (London, 1903) J. London, *The Call of the Wild* (Macmillan, 1903).
- (LSST Science Collaboration, 2012) LSST Science Collaboration, “Large Synoptic Survey Telescope: Dark Energy Science Collaboration,” (2012), arXiv:1211.0310 [astro-ph.CO].
- (LSST Science Collaboration, 2009) LSST Science Collaboration, “LSST Science Book, Version 2.0,” (2009), arXiv:0912.0201 [astro-ph.IM].
- (Lucretius, c. 55 BC) Lucretius, *De Rerum Natura (On the Nature of Things)* (c. 55 BC) Trad. R. E. Latham, J. Godwin, 1951.
- (Malik & Wands, 2009) K. A. Malik, D. Wands, *Cosmological perturbations*, *Physics Reports* **475**, 1 (2009), arXiv:0809.4944.
- (Manera *et al.*, 2013) M. Manera, R. Scoccimarro, W. J. Percival, L. Samushia, C. K. McBride, A. J. Ross, R. K. Sheth, M. White, B. A. Reid, A. G. Sánchez, R. de Putter, X. Xu, A. A. Berlind, J. Brinkmann, C. Maraston, B. Nichol, F. Montesano, N. Padmanabhan, R. A. Skibba, R. Tojeiro, B. A. Weaver, *The clustering of galaxies in the SDSS-III Baryon Oscillation Spectroscopic Survey: a large sample of mock galaxy catalogues*, *Monthly Notices of the Royal Astronomical Society* **428**, 1036 (2013), arXiv:1203.6609 [astro-ph.CO].
- (Manolakis, Ingle & Kogon, 2000) D. G. Manolakis, V. K. Ingle, S. M. Kogon, *Statistical and Adaptive Signal Processing: Spectral Estimation, Signal Modeling, Adaptive Filtering, and Array Processing* (McGraw-Hill, 2000).
- (March *et al.*, 2011) M. C. March, G. D. Starkman, R. Trotta, P. M. Vaudrevange, *Should we doubt the cosmological constant?*, *Monthly Notices of the Royal Astronomical Society* **410**, 2488 (2011), arXiv:1005.3655 [astro-ph.CO].
- (Marin *et al.*, 2012) J.-M. Marin, P. Pudlo, C. P. Robert, R. Ryder, *Approximate Bayesian Computational methods*, *Statistics and Computing* **22**, 1167 (2012), arXiv:1101.0955 [stat.CO].
- (Martel & Wasserman, 1990) H. Martel, I. Wasserman, *Simulation of cosmological voids in Lambda greater than 0 Friedmann models*, *Astrophysical Journal* **348**, 1 (1990).

- (Martínez & Saar, 2002) V. J. Martínez, E. Saar, *Statistics of the Galaxy Distribution* (Chapman & Hall, 2002).
- (Matarrese & Pietroni, 2007) S. Matarrese, M. Pietroni, *Resumming cosmic perturbations*, *Journal of Cosmology and Astroparticle Physics* **6**, 026 (2007), astro-ph/0703563.
- (Matarrese, Verde & Heavens, 1997) S. Matarrese, L. Verde, A. F. Heavens, *Large-scale bias in the Universe: bispectrum method*, *Monthly Notices of the Royal Astronomical Society* **290**, 651 (1997), astro-ph/9706059.
- (Matarrese *et al.*, 1992) S. Matarrese, F. Lucchin, L. Moscardini, D. Saez, *A frozen-flow approximation to the evolution of large-scale structures in the Universe*, *Monthly Notices of the Royal Astronomical Society* **259**, 437 (1992).
- (Mecke, Buchert & Wagner, 1994) K. R. Mecke, T. Buchert, H. Wagner, *Robust Morphological Measures for Large-Scale Structure in the Universe*, *Astronomy and Astrophysics* **288**, 697 (1994), astro-ph/9312028.
- (Melchior *et al.*, 2014) P. Melchior, P. M. Sutter, E. S. Sheldon, E. Krause, B. D. Wandelt, *First measurement of gravitational lensing by cosmic voids in SDSS*, *Monthly Notices of the Royal Astronomical Society* **440**, 2922 (2014), arXiv:1309.2045.
- (Melott, 1994) A. L. Melott, *Comparison of dynamical approximation schemes for nonlinear gravitational clustering*, *Astrophysical Journal Letters* **426** (1994), 10.1086/187329, astro-ph/9402057.
- (Melott, 1993) A. L. Melott, *Improving the reconstruction of the velocity potential and primordial density fluctuations by choice of smoothing windows*, *Astrophysical Journal* **414**, L73 (1993).
- (Melott, Buchert & Weiß, 1995) A. L. Melott, T. Buchert, A. G. Weiß, *Testing higher-order Lagrangian perturbation theory against numerical simulations. 2: Hierarchical models*, *Astronomy and Astrophysics* **294**, 345 (1995), astro-ph/9404018.
- (Melott, Pellman & Shandarin, 1994) A. L. Melott, T. F. Pellman, S. F. Shandarin, *Optimizing the Zeldovich Approximation*, *Monthly Notices of the Royal Astronomical Society* **269**, 626 (1994), astro-ph/9312044.
- (Melott *et al.*, 1983) A. L. Melott, J. Einasto, E. Saar, I. Suisalu, A. A. Klypin, S. F. Shandarin, *Cluster analysis of the nonlinear evolution of large-scale structure in an axion/gravitino/photino-dominated universe*, *Physical Review Letters* **51**, 935 (1983).
- (Mesinger & Furlanetto, 2007) A. Mesinger, S. Furlanetto, *Efficient Simulations of Early Structure Formation and Reionization*, *Astrophysical Journal* **669**, 663 (2007), arXiv:0704.0946.
- (Microsoft Research, 2009) Microsoft Research, *The Fourth Paradigm: Data-intensive Scientific Discovery*, edited by T. Hey, S. Tansley, K. Tolle (Microsoft Research, 2009).
- (Miyazaki *et al.*, 2012) S. Miyazaki, Y. Komiyama, H. Nakaya, Y. Kamata, Y. Doi, T. Hamana, H. Karoji, H. Furusawa, S. Kawanomoto, T. Morokuma, Y. Ishizuka, K. Narai, Y. Tanaka, F. Uraguchi, Y. Utsumi, Y. Obuchi, Y. Okura, M. Oguri, T. Takata, D. Tomono, T. Kurakami, K. Namikawa, T. Usuda, H. Yamanoi, T. Terai, H. Uekiyo, Y. Yamada, M. Koike, H. Aihara, Y. Fujimori, S. Mineo, H. Miyatake, N. Yasuda, J. Nishizawa, T. Saito, M. Tanaka, T. Uchida, N. Katayama, S.-Y. Wang, H.-Y. Chen, R. Lupton, C. Loomis, S. Bickerton, P. Price, J. Gunn, H. Suzuki, Y. Miyazaki, M. Muramatsu, K. Yamamoto, M. Endo, Y. Ezaki, N. Itoh, Y. Miwa, H. Yokota, T. Matsuda, R. Ebinuma, K. Takeshi, *Hyper Suprime-Cam*, in *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, Vol. 8446 (2012) p. 0.
- (Mo & White, 1996) H. J. Mo, S. D. M. White, *An analytic model for the spatial clustering of dark matter haloes*, *Monthly Notices of the Royal Astronomical Society* **282**, 347 (1996), astro-ph/9512127.
- (Mohayaee *et al.*, 2006) R. Mohayaee, H. Mathis, S. Colombi, J. Silk, *Reconstruction of primordial density fields*, *Monthly Notices of the Royal Astronomical Society* **365**, 939 (2006), astro-ph/0501217.
- (Monaco, Theuns & Taffoni, 2002) P. Monaco, T. Theuns, G. Taffoni, *The pinocchio algorithm: pinpointing orbit-crossing collapsed hierarchical objects in a linear density field*, *Monthly Notices of the Royal Astronomical Society* **331**, 587 (2002), astro-ph/0109323.

- (Monaco *et al.*, 2002) P. Monaco, T. Theuns, G. Taffoni, F. Governato, T. Quinn, J. Stadel, *Predicting the Number, Spatial Distribution, and Merging History of Dark Matter Halos*, *Astrophysical Journal* **564**, 8 (2002), astro-ph/0109322.
- (Monaco *et al.*, 2013) P. Monaco, E. Sefusatti, S. Borgani, M. Crocce, P. Fosalba, R. K. Sheth, T. Theuns, *An accurate tool for the fast generation of dark matter halo catalogues*, *Monthly Notices of the Royal Astronomical Society* **433**, 2389 (2013), arXiv:1305.1505 [astro-ph.CO].
- (Moutarde *et al.*, 1991) F. Moutarde, J.-M. Alimi, F. R. Bouchet, R. Pellat, A. Ramani, *Precollapse scale invariance in gravitational instability*, *Astrophysical Journal* **382**, 377 (1991).
- (Mukhanov, Feldman & Brandenberger, 1992) V. F. Mukhanov, H. A. Feldman, R. H. Brandenberger, *Theory of cosmological perturbations*, *Physics Reports* **215**, 203 (1992).
- (Müller *et al.*, 2000) V. Müller, S. Arbabi-Bidgoli, J. Einasto, D. Tucker, *Voids in the Las Campanas Redshift Survey versus cold dark matter models*, *Monthly Notices of the Royal Astronomical Society* **318**, 280 (2000), astro-ph/0005063.
- (Munshi & Starobinsky, 1994) D. Munshi, A. A. Starobinsky, *Nonlinear approximations to gravitational instability: A comparison in second-order perturbation theory*, *Astrophysical Journal* **428**, 433 (1994), astro-ph/9311056.
- (Nadathur & Hotchkiss, 2014) S. Nadathur, S. Hotchkiss, *A robust public catalogue of voids and superclusters in the SDSS Data Release 7 galaxy surveys*, *Monthly Notices of the Royal Astronomical Society* **440**, 1248 (2014), arXiv:1310.2791.
- (Nadathur *et al.*, 2015) S. Nadathur, S. Hotchkiss, J. M. Diego, I. T. Iliev, S. Gottlöber, W. A. Watson, G. Yepes, *Self-similarity and universality of void density profiles in simulation and SDSS data*, *Monthly Notices of the Royal Astronomical Society* **449**, 3997 (2015), arXiv:1407.1295.
- (Narayanan & Weinberg, 1998) V. K. Narayanan, D. H. Weinberg, *Reconstruction Analysis of Galaxy Redshift Surveys: A Hybrid Reconstruction Method*, *Astrophysical Journal* **508**, 440 (1998), arXiv:astro-ph/9806238.
- (Neal, 2011) R. Neal, *Handbook of Markov Chain Monte Carlo* (Chapman & Hall/CRC, 2011) Chap. MCMC Using Hamiltonian Dynamics, pp. 113–162.
- (Neyrinck, 2013) M. C. Neyrinck, *Quantifying distortions of the Lagrangian dark-matter mesh in cosmology*, *Monthly Notices of the Royal Astronomical Society* **428**, 141 (2013), arXiv:1204.1326 [astro-ph.CO].
- (Neyrinck, 2016) M. C. Neyrinck, *Truthing the stretch: non-perturbative cosmological realizations with multiscale spherical collapse*, *Monthly Notices of the Royal Astronomical Society* **455**, L11 (2016), arXiv:1503.07534.
- (Neyrinck, 2008) M. C. Neyrinck, *ZOBOV: a parameter-free void-finding algorithm*, *Monthly Notices of the Royal Astronomical Society* **386**, 2101 (2008), arXiv:0712.3049.
- (Neyrinck, 2015) M. C. Neyrinck, *Kolmogorov complexity in the Milky Way and its reduction with warm dark matter*, *Monthly Notices of the Royal Astronomical Society* **452**, L26 (2015), arXiv:1409.0057.
- (Neyrinck, 2012) M. C. Neyrinck, *Origami constraints on the initial-conditions arrangement of dark-matter caustics and streams*, *Monthly Notices of the Royal Astronomical Society* **427**, 494 (2012), arXiv:1202.3364 [astro-ph.CO].
- (Neyrinck & Yang, 2013) M. C. Neyrinck, L. F. Yang, *Ringing the initial Universe: the response of overdensity and transformed-density power spectra to initial spikes*, *Monthly Notices of the Royal Astronomical Society* **433**, 1628 (2013), arXiv:1305.1629 [astro-ph.CO].
- (Neyrinck, Szapudi & Szalay, 2011) M. C. Neyrinck, I. Szapudi, A. S. Szalay, *Rejuvenating Power Spectra. II. The Gaussianized Galaxy Density Field*, *Astrophysical Journal* **731**, 116 (2011), arXiv:1009.5680 [astro-ph.CO].

- (Neyrinck, Szapudi & Szalay, 2009) M. C. Neyrinck, I. Szapudi, A. S. Szalay, *Rejuvenating the Matter Power Spectrum: Restoring Information with a Logarithmic Density Mapping*, *Astrophysical Journal Letters* **698**, L90 (2009), arXiv:0903.4693 [astro-ph.CO].
- (Norberg *et al.*, 2001) P. Norberg, C. M. Baugh, E. Hawkins, S. Maddox, J. A. Peacock, S. Cole, C. S. Frenk, J. Bland-Hawthorn, T. Bridges, R. Cannon, M. Colless, C. Collins, W. Couch, G. Dalton, R. De Propris, S. P. Driver, G. Efstathiou, R. S. Ellis, K. Glazebrook, C. Jackson, O. Lahav, I. Lewis, S. Lumsden, D. Madgwick, B. A. Peterson, W. Sutherland, K. Taylor, *The 2dF Galaxy Redshift Survey: luminosity dependence of galaxy clustering*, *Monthly Notices of the Royal Astronomical Society* **328**, 64 (2001), astro-ph/0105500.
- (Novikov, Colombi & Doré, 2006) D. Novikov, S. Colombi, O. Doré, *Skeleton as a probe of the cosmic web: the two-dimensional case*, *Monthly Notices of the Royal Astronomical Society* **366**, 1201 (2006), astro-ph/0307003.
- (Nuza *et al.*, 2014) S. E. Nuza, F.-S. Kitaura, S. Heß, N. I. Libeskind, V. Müller, *The cosmic web of the Local Universe: cosmic variance, matter content and its relation to galaxy morphology*, *Monthly Notices of the Royal Astronomical Society* **445**, 988 (2014), arXiv:1406.1004 [astro-ph.CO].
- (Nyquist, 1928) H. Nyquist, *Certain Topics in Telegraph Transmission Theory*, *Transactions of the American Institute of Electrical Engineers* **47**, 617 (1928).
- (Obreschkow *et al.*, 2013) D. Obreschkow, C. Power, M. Bruderer, C. Bonvin, *A Robust Measure of Cosmic Structure beyond the Power Spectrum: Cosmic Filaments and the Temperature of Dark Matter*, *Astrophysical Journal* **762**, 115 (2013), arXiv:1211.5213 [astro-ph.CO].
- (Padilla, Ceccarelli & Lambas, 2005) N. D. Padilla, L. Ceccarelli, D. G. Lambas, *Spatial and dynamical properties of voids in a Λ cold dark matter universe*, *Monthly Notices of the Royal Astronomical Society* **363**, 977 (2005), astro-ph/0508297.
- (Padmanabhan *et al.*, 2012) N. Padmanabhan, X. Xu, D. J. Eisenstein, R. Scalzo, A. J. Cuesta, K. T. Mehta, E. Kazin, *A 2 per cent distance to $z = 0.35$ by reconstructing baryon acoustic oscillations - I. Methods and application to the Sloan Digital Sky Survey*, *Monthly Notices of the Royal Astronomical Society* **427**, 2132 (2012), arXiv:1202.0090.
- (Pan *et al.*, 2012) D. C. Pan, M. S. Vogeley, F. Hoyle, Y.-Y. Choi, C. Park, *Cosmic voids in Sloan Digital Sky Survey Data Release 7*, *Monthly Notices of the Royal Astronomical Society* **421**, 926 (2012), arXiv:1103.4156 [astro-ph.CO].
- (Park & Lee, 2007) D. Park, J. Lee, *Void Ellipticity Distribution as a Probe of Cosmology*, *Physical Review Letters* **98**, 081301 (2007), astro-ph/0610520.
- (Park, Kim & Park, 2010) H. Park, J. Kim, C. Park, *Gravitational Potential Environment of Galaxies. I. Simulation*, *Astrophysical Journal* **714**, 207 (2010), arXiv:1004.0280 [astro-ph.CO].
- (Paz, Stasyszyn & Padilla, 2008) D. J. Paz, F. Stasyszyn, N. D. Padilla, *Angular momentum-large-scale structure alignments in Λ CDM models and the SDSS*, *Monthly Notices of the Royal Astronomical Society* **389**, 1127 (2008), arXiv:0804.4477.
- (Paz *et al.*, 2013) D. Paz, M. Lares, L. Ceccarelli, N. Padilla, D. G. Lambas, *Clues on void evolution-II. Measuring density and velocity profiles on SDSS galaxy redshift space distortions*, *Monthly Notices of the Royal Astronomical Society* **436**, 3480 (2013), arXiv:1306.5799 [astro-ph.CO].
- (Peacock, 1999) J. A. Peacock, *Cosmological Physics* (Cambridge University Press, 1999).
- (Peacock & Smith, 2000) J. A. Peacock, R. E. Smith, *Halo occupation numbers and galaxy bias*, *Monthly Notices of the Royal Astronomical Society* **318**, 1144 (2000), astro-ph/0005010.
- (Peacock & Heavens, 1985) J. A. Peacock, A. F. Heavens, *The statistics of maxima in primordial density perturbations*, *Monthly Notices of the Royal Astronomical Society* **217**, 805 (1985).

- (Peacock *et al.*, 2001) J. A. Peacock, S. Cole, P. Norberg, C. M. Baugh, J. Bland-Hawthorn, T. Bridges, R. D. Cannon, M. Colless, C. Collins, W. Couch, G. Dalton, K. Deeley, R. De Propris, S. P. Driver, G. Efstathiou, R. S. Ellis, C. S. Frenk, K. Glazebrook, C. Jackson, O. Lahav, I. Lewis, S. Lumsden, S. Maddox, W. J. Percival, B. A. Peterson, I. Price, W. Sutherland, K. Taylor, *A measurement of the cosmological mass density from clustering in the 2dF Galaxy Redshift Survey*, Nature **410**, 169 (2001), astro-ph/0103143.
- (Peebles, 1980) P. J. E. Peebles, *The large-scale structure of the universe* (Princeton University Press, 1980).
- (Peebles, 1984) P. J. E. Peebles, *Dark matter and the origin of galaxies and globular star clusters*, Astrophysical Journal **277**, 470 (1984).
- (Peebles, 1976) P. J. E. Peebles, *The Peculiar Velocity Field in the Local Supercluster*, Astrophysical Journal **205**, 318 (1976).
- (Peebles, 1982a) P. J. E. Peebles, *Primeval adiabatic perturbations - Effect of massive neutrinos*, Astrophysical Journal **258**, 415 (1982a).
- (Peebles, 1982b) P. J. E. Peebles, *Large-scale background temperature and mass fluctuations due to scale-invariant primeval perturbations*, Astrophysical Journal Letters **263**, L1 (1982b).
- (Percival, 2005a) W. J. Percival, *Markov chain reconstruction of the 2dF Galaxy Redshift Survey real-space power spectrum*, Monthly Notices of the Royal Astronomical Society **356**, 1168 (2005a), astro-ph/0410631.
- (Percival, 2005b) W. J. Percival, *Cosmological structure formation in a homogeneous dark energy background*, Astronomy and Astrophysics **443**, 819 (2005b), astro-ph/0508156.
- (Percival, 2014) W. J. Percival, *Large Scale Structure Observations*, in *Lecture Notes of the Les Houches Summer School “Post-Planck Cosmology”: Volume 100, July 2013*, edited by C. Deffayet, P. Peter, B. Wandelt, M. Zaldarriaga, L. F. Cugliandolo (2014) arXiv:1312.5490 [astro-ph.CO].
- (Percival & White, 2009) W. J. Percival, M. White, *Testing cosmological structure formation using redshift-space distortions*, Monthly Notices of the Royal Astronomical Society **393**, 297 (2009), arXiv:0808.0003.
- (Percival, Verde & Peacock, 2004) W. J. Percival, L. Verde, J. A. Peacock, *Fourier analysis of luminosity-dependent galaxy clustering*, Monthly Notices of the Royal Astronomical Society **347**, 645 (2004), astro-ph/0306511.
- (Percival *et al.*, 2001) W. J. Percival, C. M. Baugh, J. Bland-Hawthorn, T. Bridges, R. Cannon, S. Cole, M. Colless, C. Collins, W. Couch, G. Dalton, R. De Propris, S. P. Driver, G. Efstathiou, R. S. Ellis, C. S. Frenk, K. Glazebrook, C. Jackson, O. Lahav, I. Lewis, S. Lumsden, S. Maddox, S. Moody, P. Norberg, J. A. Peacock, B. A. Peterson, W. Sutherland, K. Taylor, *The 2dF Galaxy Redshift Survey: the power spectrum and the matter content of the Universe*, Monthly Notices of the Royal Astronomical Society **327**, 1297 (2001), astro-ph/0105252.
- (Percival *et al.*, 2010) W. J. Percival, B. A. Reid, D. J. Eisenstein, N. A. Bahcall, T. Budavari, J. A. Frieman, M. Fukugita, J. E. Gunn, Ž. Ivezić, G. R. Knapp, R. G. Kron, J. Loveday, R. H. Lupton, T. A. McKay, A. Meiksin, R. C. Nichol, A. C. Pope, D. J. Schlegel, D. P. Schneider, D. N. Spergel, C. Stoughton, M. A. Strauss, A. S. Szalay, M. Tegmark, M. S. Vogeley, D. H. Weinberg, D. G. York, I. Zehavi, *Baryon acoustic oscillations in the Sloan Digital Sky Survey Data Release 7 galaxy sample*, Monthly Notices of the Royal Astronomical Society **401**, 2148 (2010), arXiv:0907.1660 [astro-ph.CO].
- (Pichon & Bernardeau, 1999) C. Pichon, F. Bernardeau, *Vorticity generation in large-scale structure caustics*, Astronomy and Astrophysics **343**, 663 (1999), astro-ph/9902142.
- (Pirates of the Caribbean: At World’s End, 2007) Pirates of the Caribbean: At World’s End, (2007).
- (Pisani *et al.*, 2014) A. Pisani, G. Lavaux, P. M. Sutter, B. D. Wandelt, *Real-space density profile reconstruction of stacked voids*, Monthly Notices of the Royal Astronomical Society **443**, 3238 (2014), arXiv:1306.3052 [astro-ph.CO].

- (Pisani *et al.*, 2015) A. Pisani, P. M. Sutter, N. Hamaus, E. Alizadeh, R. Biswas, B. D. Wandelt, C. M. Hirata, *Counting voids to probe dark energy*, *Physical Review D* **92**, 083531 (2015), arXiv:1503.07690.
- (Planck Collaboration, 2015) Planck Collaboration, *Planck 2015 results. XVII. Constraints on primordial non-Gaussianity*, ArXiv e-prints (2015), arXiv:1502.01592 [astro-ph.CO].
- (Planck Collaboration, 2014a) Planck Collaboration, *Planck 2013 results. XIX. The integrated Sachs-Wolfe effect*, *Astronomy and Astrophysics* **571**, A19 (2014a), arXiv:1303.5079 [astro-ph.CO].
- (Planck Collaboration, 2014b) Planck Collaboration, *Planck 2013 results. XXIV. Constraints on primordial non-Gaussianity*, *Astronomy and Astrophysics* **571**, A24 (2014b), arXiv:1303.5084 [astro-ph.CO].
- (Platen, van de Weygaert & Jones, 2008) E. Platen, R. van de Weygaert, B. J. T. Jones, *Alignment of voids in the cosmic web*, *Monthly Notices of the Royal Astronomical Society* **387**, 128 (2008), arXiv:0711.2480.
- (Platen, van de Weygaert & Jones, 2007) E. Platen, R. van de Weygaert, B. J. T. Jones, *A cosmic watershed: the WVF void detection technique*, *Monthly Notices of the Royal Astronomical Society* **380**, 551 (2007), arXiv:0706.2788.
- (Plionis & Basilakos, 2002) M. Plionis, S. Basilakos, *The size and shape of local voids*, *Monthly Notices of the Royal Astronomical Society* **330**, 399 (2002), astro-ph/0106491.
- (Poincaré, 1900) H. Poincaré, Letter in *Le Temps* (1900).
- (Pólya, 1954a) G. Pólya, *Mathematics and Plausible Reasoning, Volume 1: Induction and Analogy in Mathematics* (Princeton University Press, 1954).
- (Pólya, 1954b) G. Pólya, *Mathematics and Plausible Reasoning, Volume 2: Patterns of Plausible Inference* (Princeton University Press, 1954).
- (Popper, 1972) K. R. Popper, *Objective Knowledge: An Evolutionary Approach* (Oxford University Press, 1972).
- (Pratchett, 1990) T. Pratchett, *Moving Pictures* (Victor Gollancz, 1990).
- (Protogeros & Scherrer, 1997) Z. A. M. Protogeros, R. J. Scherrer, *Local Lagrangian approximations for the evolution of the density distribution function in large-scale structure*, *Monthly Notices of the Royal Astronomical Society* **284**, 425 (1997), astro-ph/9603155.
- (Prunet *et al.*, 2008) S. Prunet, C. Pichon, D. Aubert, D. Pogosyan, R. Teyssier, S. Gottloeber, *Initial Conditions For Large Cosmological Simulations*, *Astrophysical Journal Supplement* **178**, 179 (2008), arXiv:0804.3536.
- (Pueblas & Scoccimarro, 2009) S. Pueblas, R. Scoccimarro, *Generation of vorticity and velocity dispersion by orbit crossing*, *Physical Review D* **80**, 043504 (2009), arXiv:0809.4606.
- (Rees & Ostriker, 1977) M. J. Rees, J. P. Ostriker, *Cooling, dynamics and fragmentation of massive gas clouds - Clues to the masses and radii of galaxies and clusters*, *Monthly Notices of the Royal Astronomical Society* **179**, 541 (1977).
- (Reeve, 1995) F. D. Reeve, *Coasting*, in *The American Poetry Review*, Vol. 24 (1995) p. 38.
- (Ricciardelli, Quilis & Varela, 2014) E. Ricciardelli, V. Quilis, J. Varela, *On the universality of void density profiles*, *Monthly Notices of the Royal Astronomical Society* **440**, 601 (2014), arXiv:1402.2976 [astro-ph.CO].
- (Ryden, 1995) B. S. Ryden, *Measuring Q from the Distortion of Voids in Redshift Space*, *Astrophysical Journal* **452**, 25 (1995), astro-ph/9506028.
- (Sahni & Shandarin, 1996) V. Sahni, S. Shandarin, *Accuracy of Lagrangian approximations in voids*, *Monthly Notices of the Royal Astronomical Society* **282**, 641 (1996), astro-ph/9510142.
- (Sahni & Coles, 1995) V. Sahni, P. Coles, *Approximation methods for non-linear gravitational clustering*, *Physics Reports* **262**, 1 (1995), astro-ph/9505005.

- ([Sahni, Sathyaprakash & Shandarin, 1998](#)) V. Sahni, B. S. Sathyaprakash, S. F. Shandarin, *Shapefinders: A New Shape Diagnostic for Large-Scale Structure*, *Astrophysical Journal Letters* **495**, L5 (1998), astro-ph/9801053.
- ([Sahni, Sathyaprakash & Shandarin, 1994](#)) V. Sahni, B. S. Sathyaprakash, S. F. Shandarin, *The evolution of voids in the adhesion approximation*, *Astrophysical Journal* **431**, 20 (1994), astro-ph/9403044.
- ([Schaap, 2007](#)) W. E. Schaap, *DTFE: the Delaunay Tessellation Field Estimator*, Ph.D. thesis, University of Groningen (2007).
- ([Schaap & van de Weygaert, 2000](#)) W. E. Schaap, R. van de Weygaert, *Continuous fields and discrete samples: reconstruction through Delaunay tessellations*, *Astronomy and Astrophysics* **363**, L29 (2000), astro-ph/0011007.
- ([Schechter, 1976](#)) P. Schechter, *An analytic expression for the luminosity function for galaxies.*, *Astrophysical Journal* **203**, 297 (1976).
- ([Schlegel et al., 2011](#)) D. Schlegel, F. Abdalla, T. Abraham, C. Ahn, C. Allende Prieto, J. Annis, E. Aubourg, M. Azzaro, S. B. C. Baltay, C. Baugh, C. Bebek, S. Becerril, M. Blanton, A. Bolton, B. Bromley, R. Cahn, P. Carton, J. L. Cervantes-Cota, Y. Chu, M. Cortes, K. Dawson, A. Dey, M. Dickinson, H. T. Diehl, P. Doel, A. Ealet, J. Edelstein, D. Eppelle, S. Escoffier, A. Evrard, L. Faccioli, C. Frenk, M. Geha, D. Gerdes, P. Gondolo, A. Gonzalez-Arroyo, B. Grossan, T. Heckman, H. Heetderks, S. Ho, K. Honscheid, D. Huterer, O. Ilbert, I. Ivans, P. Jelinsky, Y. Jing, D. Joyce, R. Kennedy, S. Kent, D. Kieda, A. Kim, C. Kim, J. Kneib, X. Kong, A. Kosowsky, K. Krishnan, O. Lahav, M. Lampton, S. LeBohec, V. Le Brun, M. Levi, C. Li, M. Liang, H. Lim, W. Lin, E. Linder, W. Lorenzon, A. de la Macorra, C. Magneville, R. Malina, C. Marinoni, V. Martinez, S. Majewski, T. Matheson, R. McCloskey, P. McDonald, T. McKay, J. McMahon, B. Menard, J. Miralda-Escude, M. Modjaz, A. Montero-Dorta, I. Morales, N. Mostek, J. Newman, R. Nichol, P. Nugent, K. Olsen, N. Padmanabhan, N. Palanque-Delabrouille, I. Park, J. Peacock, W. Percival, S. Perlmutter, C. Peroux, P. Petitjean, F. Prada, E. Prieto, J. Prochaska, K. Reil, C. Rockosi, N. Roe, E. Rollinde, A. Roodman, N. Ross, G. Rudnick, V. Ruhlmann-Kleider, J. Sanchez, D. Sawyer, C. Schimd, M. Schubnell, R. Scoccimarro, U. Seljak, H. Seo, E. Sheldon, M. Sholl, R. Shulte-Ladbeck, A. Slosar, D. S. Smith, G. Smoot, W. Springer, A. Stril, A. S. Szalay, C. Tao, G. Tarle, E. Taylor, A. Tilquin, J. Tinker, F. Valdes, J. Wang, T. Wang, B. A. Weaver, D. Weinberg, M. White, M. Wood-Vasey, J. Yang, X. Y. C. Yee, N. Zakamska, A. Zentner, C. Zhai, P. Zhang, *The BigBOSS Experiment*, ArXiv e-prints (2011), arXiv:1106.1706 [astro-ph.IM].
- ([Schmittfull, Baldauf & Seljak, 2015](#)) M. Schmittfull, T. Baldauf, U. Seljak, *Near optimal bispectrum estimators for large-scale structure*, *Physical Review D* **91**, 043530 (2015), arXiv:1411.6595.
- ([Schuecker & Ott, 1991](#)) P. Schuecker, H.-A. Ott, *Scales of structures and homogeneity in the universe*, *Astrophysical Journal Letters* **378**, L1 (1991).
- ([Scoccimarro, 1997](#)) R. Scoccimarro, *Cosmological Perturbations: Entering the Nonlinear Regime*, *Astrophysical Journal* **487**, 1 (1997), astro-ph/9612207.
- ([Scoccimarro, 1998](#)) R. Scoccimarro, *Transients from initial conditions: a perturbative analysis*, *Monthly Notices of the Royal Astronomical Society* **299**, 1097 (1998), astro-ph/9711187.
- ([Scoccimarro, 2000](#)) R. Scoccimarro, *The Bispectrum: From Theory to Observations*, *Astrophysical Journal* **544**, 597 (2000), astro-ph/0004086.
- ([Scoccimarro & Sheth, 2002](#)) R. Scoccimarro, R. K. Sheth, *PTHALOS: a fast method for generating mock galaxy distributions*, *Monthly Notices of the Royal Astronomical Society* **329**, 629 (2002), astro-ph/0106120.
- ([Scoccimarro et al., 2001](#)) R. Scoccimarro, H. A. Feldman, J. N. Fry, J. A. Frieman, *The Bispectrum of IRAS Redshift Catalogs*, *Astrophysical Journal* **546**, 652 (2001), astro-ph/0004087.
- ([Sefusatti & Komatsu, 2007](#)) E. Sefusatti, E. Komatsu, *Bispectrum of galaxies from high-redshift galaxy surveys: Primordial non-Gaussianity and nonlinear galaxy bias*, *Physical Review D* **76**, 083004 (2007), arXiv:0705.0343.
- ([Seljak, 2000](#)) U. Seljak, *Analytic model for galaxy and dark matter clustering*, *Monthly Notices of the Royal Astronomical Society* **318**, 203 (2000), astro-ph/0001493.

- (Seljak & Zaldarriaga, 1996) U. Seljak, M. Zaldarriaga, *A Line-of-Sight Integration Approach to Cosmic Microwave Background Anisotropies*, *Astrophysical Journal* **469**, 437 (1996), astro-ph/9603033.
- (Senatore & Zaldarriaga, 2015) L. Senatore, M. Zaldarriaga, *The IR-resummed Effective Field Theory of Large Scale Structures*, *Journal of Cosmology and Astroparticle Physics* **2**, 013 (2015), arXiv:1404.5954.
- (Service, 1907) R. W. Service, *The Spell of the Yukon*, in *Songs of a Sourdough* (1907).
- (Shandarin & Zel'dovich, 1989) S. F. Shandarin, Y. B. Zel'dovich, *The large-scale structure of the universe: Turbulence, intermittency, structures in a self-gravitating medium*, *Reviews of Modern Physics* **61**, 185 (1989).
- (Shandarin, Habib & Heitmann, 2012) S. Shandarin, S. Habib, K. Heitmann, *Cosmic web, multistream flows, and tessellations*, *Physical Review D* **85**, 083005 (2012), arXiv:1111.2366 [astro-ph.CO].
- (Shandarin *et al.*, 2006) S. Shandarin, H. A. Feldman, K. Heitmann, S. Habib, *Shapes and sizes of voids in the Lambda cold dark matter universe: excursion set approach*, *Monthly Notices of the Royal Astronomical Society* **367**, 1629 (2006), astro-ph/0509858.
- (Shannon, 1948) C. E. Shannon, *A Mathematical Theory of Communication*, *Bell System Technical Journal* **27**, 379 (1948).
- (Shannon, 1949) C. E. Shannon, *Communication in the Presence of Noise*, *Proc. Institute of Radio Engineers* **37**, 10 (1949).
- (Shectman *et al.*, 1996) S. A. Shectman, S. D. Landy, A. Oemler, D. L. Tucker, H. Lin, R. P. Kirshner, P. L. Schechter, *The Las Campanas Redshift Survey*, *Astrophysical Journal* **470**, 172 (1996), astro-ph/9604167.
- (Shen *et al.*, 2006) J. Shen, T. Abel, H. J. Mo, R. K. Sheth, *An Excursion Set Model of the Cosmic Web: The Abundance of Sheets, Filaments, and Halos*, *Astrophysical Journal* **645**, 783 (2006), astro-ph/0511365.
- (Sheth & van de Weygaert, 2004) R. K. Sheth, R. van de Weygaert, *A hierarchy of voids: much ado about nothing*, *Monthly Notices of the Royal Astronomical Society* **350**, 517 (2004), astro-ph/0311260.
- (Shi, Wang & Mo, 2015) J. Shi, H. Wang, H. J. Mo, *Flow Patterns around Dark Matter Halos: The Link between Halo Dynamical Properties and Large-scale Tidal Field*, *Astrophysical Journal* **807**, 37 (2015), arXiv:1501.07764.
- (Shirata *et al.*, 2007) A. Shirata, Y. Suto, C. Hikage, T. Shiromizu, N. Yoshida, *Galaxy clustering constraints on deviations from Newtonian gravity at cosmological scales. II. Perturbative and numerical analyses of power spectrum and bispectrum*, *Physical Review D* **76**, 044026 (2007), arXiv:0705.1311.
- (Shoji & Lee, 2012) M. Shoji, J. Lee, *Voids in Redshift Space*, ArXiv e-prints (2012), arXiv:1203.0869 [astro-ph.CO].
- (Short & Coles, 2006a) C. J. Short, P. Coles, *Gravitational instability via the Schrödinger equation*, *Journal of Cosmology and Astroparticle Physics* **12**, 12 (2006a), arXiv:astro-ph/0605012.
- (Short & Coles, 2006b) C. J. Short, P. Coles, *Wave mechanics and the adhesion approximation*, *Journal of Cosmology and Astroparticle Physics* **12**, 16 (2006b), arXiv:astro-ph/0605013.
- (Silk, 1968) J. Silk, *Cosmic Black-Body Radiation and Galaxy Formation*, *Astrophysical Journal* **151**, 459 (1968).
- (Silk, 1977) J. Silk, *On the fragmentation of cosmic gas clouds. I - The formation of galaxies and the first generation of stars*, *Astrophysical Journal* **211**, 638 (1977).
- (Somerville *et al.*, 2001) R. S. Somerville, G. Lemson, Y. Sigad, A. Dekel, G. Kauffmann, S. D. M. White, *Non-linear stochastic galaxy biasing in cosmological simulations*, *Monthly Notices of the Royal Astronomical Society* **320**, 289 (2001), astro-ph/9912073.
- (Sousbie, 2011) T. Sousbie, *The persistent cosmic web and its filamentary structure - I. Theory and implementation*, *Monthly Notices of the Royal Astronomical Society* **414**, 350 (2011), arXiv:1009.4015 [astro-ph.CO].

- (Sousbie, Pichon & Kawahara, 2011) T. Sousbie, C. Pichon, H. Kawahara, *The persistent cosmic web and its filamentary structure - II. Illustrations*, Monthly Notices of the Royal Astronomical Society **414**, 384 (2011), arXiv:1009.4014 [astro-ph.CO].
- (Sousbie *et al.*, 2008) T. Sousbie, C. Pichon, S. Colombi, D. Novikov, D. Pogosyan, *The 3D skeleton: tracing the filamentary structure of the Universe*, Monthly Notices of the Royal Astronomical Society **383**, 1655 (2008), arXiv:0707.3123.
- (Spergel *et al.*, 2013) D. Spergel, N. Gehrels, J. Breckinridge, M. Donahue, A. Dressler, B. S. Gaudi, T. Greene, O. Guyon, C. Hirata, J. Kalirai, N. J. Kasdin, W. Moos, S. Perlmutter, M. Postman, B. Rauscher, J. Rhodes, Y. Wang, D. Weinberg, J. Centrella, W. Traub, C. Baltay, J. Colbert, D. Bennett, A. Kiessling, B. Macintosh, J. Merten, M. Mortonson, M. Penny, E. Rozo, D. Savransky, K. Stapelfeldt, Y. Zu, C. Baker, E. Cheng, D. Content, J. Dooley, M. Foote, R. Goullioud, K. Grady, C. Jackson, J. Kruck, M. Levine, M. Melton, C. Peddie, J. Ruffa, S. Shaklan, *Wide-Field InfraRed Survey Telescope-Astrophysics Focused Telescope Assets WFIRST-AFTA Final Report*, ArXiv e-prints (2013), arXiv:1305.5422 [astro-ph.IM].
- (Spolyar, Sahlén & Silk, 2013) D. Spolyar, M. Sahlén, J. Silk, *Topology and Dark Energy: Testing Gravity in Voids*, Physical Review Letters **111**, 241103 (2013), arXiv:1304.5239 [astro-ph.CO].
- (Springel, 2005) V. Springel, *The cosmological simulation code GADGET-2*, Monthly Notices of the Royal Astronomical Society **364**, 1105 (2005), astro-ph/0505010.
- (Springel, 2014) V. Springel, *High performance computing and numerical modelling*, in *Lecture notes given at the 43rd Saas Fee Advanced School, March 11-16, 2013, Villars-sur-Ollon, Switzerland* (2014) arXiv:1412.5187.
- (Springel, Yoshida & White, 2001) V. Springel, N. Yoshida, S. D. M. White, *GADGET: a code for collisionless and gasdynamical cosmological simulations*, New Astronomy **6**, 79 (2001), astro-ph/0003162.
- (Star Trek: First Contact, 1996) Star Trek: First Contact, (1996).
- (Starkman, Trotta & Vaudrevange, 2008) G. D. Starkman, R. Trotta, P. M. Vaudrevange, *Introducing doubt in Bayesian model comparison*, ArXiv e-prints (2008), 0811.2415.
- (Starobinsky, 1982) A. A. Starobinsky, *Dynamics of phase transition in the new inflationary universe scenario and generation of perturbations*, Physics Letters B **117**, 175 (1982).
- (Stoica, Martínez & Saar, 2010) R. S. Stoica, V. J. Martínez, E. Saar, *Filaments in observed and mock galaxy catalogues*, Astronomy and Astrophysics **510**, A38 (2010), arXiv:0912.2021 [astro-ph.CO].
- (Stoica, Martínez & Saar, 2007) R. S. Stoica, V. J. Martínez, E. Saar, *A three-dimensional object point process for detection of cosmic filaments.*, Journal of the Royal Statistical Society: Series C (Applied Statistics) **56** (4), 459-477 **56**, 1 (2007).
- (Stoica *et al.*, 2005) R. S. Stoica, V. J. Martínez, J. Mateu, E. Saar, *Detection of cosmic filaments using the Candy model*, Astronomy and Astrophysics **434**, 423 (2005), astro-ph/0405370.
- (Stover, 2003) M. Stover, *Star Wars: Shatterpoint* (Del Rey, 2003).
- (Strauss *et al.*, 2002) M. A. Strauss, D. H. Weinberg, R. H. Lupton, V. K. Narayanan, J. Annis, M. Bernardi, M. Blanton, S. Burles, A. J. Connolly, J. Dalcanton, M. Doi, D. Eisenstein, J. A. Frieman, M. Fukugita, J. E. Gunn, Ž. Ivezić, S. Kent, R. S. J. Kim, G. R. Knapp, R. G. Kron, J. A. Munn, H. J. Newberg, R. C. Nichol, S. Okamura, T. R. Quinn, M. W. Richmond, D. J. Schlegel, K. Shimasaku, M. SubbaRao, A. S. Szalay, D. Vanden Berk, M. S. Vogeley, B. Yanny, N. Yasuda, D. G. York, I. Zehavi, *Spectroscopic Target Selection in the Sloan Digital Sky Survey: The Main Galaxy Sample*, Astronomical Journal **124**, 1810 (2002), astro-ph/0206225.
- (Sutter *et al.*, 2015a) P. M. Sutter, E. Carlesi, B. D. Wandelt, A. Knebe, *On the observability of coupled dark energy with cosmic voids*, Monthly Notices of the Royal Astronomical Society **446**, L1 (2015a), arXiv:1406.0511.
- (Sutter *et al.*, 2014a) P. M. Sutter, A. Pisani, B. D. Wandelt, D. H. Weinberg, *A measurement of the Alcock-Paczynski effect using cosmic voids in the SDSS*, Monthly Notices of the Royal Astronomical Society **443**, 2983 (2014a), arXiv:1404.5618.

- (Sutter *et al.*, 2012a) P. M. Sutter, G. Lavaux, B. D. Wandelt, D. H. Weinberg, *A First Application of the Alcock-Paczynski Test to Stacked Cosmic Voids*, *Astrophysical Journal* **761**, 187 (2012a), arXiv:1208.1058 [astro-ph.CO].
- (Sutter *et al.*, 2012b) P. M. Sutter, G. Lavaux, B. D. Wandelt, D. H. Weinberg, *A Public Void Catalog from the SDSS DR7 Galaxy Redshift Surveys Based on the Watershed Transform*, *Astrophysical Journal* **761**, 44 (2012b), arXiv:1207.2524 [astro-ph.CO].
- (Sutter *et al.*, 2014b) P. M. Sutter, G. Lavaux, B. D. Wandelt, D. H. Weinberg, M. S. Warren, *The dark matter of galaxy voids*, *Monthly Notices of the Royal Astronomical Society* **438**, 3177 (2014b), arXiv:1311.3301 [astro-ph.CO].
- (Sutter *et al.*, 2014c) P. M. Sutter, G. Lavaux, N. Hamaus, B. D. Wandelt, D. H. Weinberg, M. S. Warren, *Sparse sampling, galaxy bias, and voids*, *Monthly Notices of the Royal Astronomical Society* **442**, 462 (2014c), arXiv:1309.5087.
- (Sutter *et al.*, 2014d) P. M. Sutter, G. Lavaux, B. D. Wandelt, D. H. Weinberg, M. S. Warren, A. Pisani, *Voids in the SDSS DR9: observations, simulations, and the impact of the survey mask*, *Monthly Notices of the Royal Astronomical Society* **442**, 3127 (2014d), arXiv:1310.7155.
- (Sutter *et al.*, 2015b) P. M. Sutter, G. Lavaux, N. Hamaus, A. Pisani, B. D. Wandelt, M. Warren, F. Villaescusa-Navarro, P. Zivick, Q. Mao, B. B. Thompson, *VIDE: The Void IDentification and Examination toolkit*, *Astronomy and Computing* **9**, 1 (2015b), arXiv:1406.1191.
- (Szalay, 2014) A. Szalay, *From Genes to Stars: the Fourth Paradigm of Science* (Public conference given at the Academia das Ciências de Lisboa on May 27th, 2014).
- (Tadros *et al.*, 1999) H. Tadros, W. E. Ballinger, A. N. Taylor, A. F. Heavens, G. Efstathiou, W. Saunders, C. S. Frenk, O. Keeble, R. McMahon, S. J. Maddox, S. Oliver, M. Rowan-Robinson, W. J. Sutherland, S. D. M. White, *Spherical harmonic analysis of the PSCz galaxy catalogue: redshift distortions and the real-space power spectrum*, *Monthly Notices of the Royal Astronomical Society* **305**, 527 (1999), astro-ph/9901351.
- (Taffoni, Monaco & Theuns, 2002) G. Taffoni, P. Monaco, T. Theuns, *PINOCHIO and the hierarchical build-up of dark matter haloes*, *Monthly Notices of the Royal Astronomical Society* **333**, 623 (2002), astro-ph/0109324.
- (Takada *et al.*, 2014) M. Takada, R. S. Ellis, M. Chiba, J. E. Greene, H. Aihara, N. Arimoto, K. Bundy, J. Cohen, O. Doré, G. Graves, J. E. Gunn, T. Heckman, C. M. Hirata, P. Ho, J.-P. Kneib, O. L. Fèvre, L. Lin, S. More, H. Murayama, T. Nagao, M. Ouchi, M. Seiffert, J. D. Silverman, L. Sodré, D. N. Spergel, M. A. Strauss, H. Sugai, Y. Suto, H. Takami, R. Wyse, *Extragalactic science, cosmology, and Galactic archaeology with the Subaru Prime Focus Spectrograph*, *Publications of the Astronomical Society of Japan* **66**, R1 (2014), arXiv:1206.0737.
- (Taoso, Bertone & Masiero, 2008) M. Taoso, G. Bertone, A. Masiero, *Dark matter candidates: a ten-point test*, *Journal of Cosmology and Astroparticle Physics* **3**, 022 (2008), arXiv:0711.4996.
- (Tassev & Zaldarriaga, 2012a) S. Tassev, M. Zaldarriaga, *The mildly non-linear regime of structure formation*, *Journal of Cosmology and Astroparticle Physics* **4**, 013 (2012a), arXiv:1109.4939 [astro-ph.CO].
- (Tassev & Zaldarriaga, 2012b) S. Tassev, M. Zaldarriaga, *Towards an optimal reconstruction of baryon oscillations*, *Journal of Cosmology and Astroparticle Physics* **10**, 006 (2012b), arXiv:1203.6066 [astro-ph.CO].
- (Tassev & Zaldarriaga, 2012c) S. Tassev, M. Zaldarriaga, *Estimating CDM particle trajectories in the mildly non-linear regime of structure formation. Implications for the density field in real and redshift space*, *Journal of Cosmology and Astroparticle Physics* **12**, 011 (2012c), arXiv:1203.5785 [astro-ph.CO].
- (Tassev, Zaldarriaga & Eisenstein, 2013) S. Tassev, M. Zaldarriaga, D. J. Eisenstein, *Solving large scale structure in ten easy steps with COLA*, *Journal of Cosmology and Astroparticle Physics* **6**, 036 (2013), arXiv:1301.0322 [astro-ph.CO].
- (Tassev *et al.*, 2015) S. Tassev, D. J. Eisenstein, B. D. Wandelt, M. Zaldarriaga, “sCOLA: The N-body COLA Method Extended to the Spatial Domain,” (2015), arXiv:1502.07751 [astro-ph.CO].

- ([Taylor, Ashdown & Hobson, 2008](#)) J. F. Taylor, M. A. J. Ashdown, M. P. Hobson, *Fast optimal CMB power spectrum estimation with Hamiltonian sampling*, *Monthly Notices of the Royal Astronomical Society* **389**, 1284 (2008), arXiv:0708.2989.
- ([Tegmark et al., 2004](#)) M. Tegmark, M. R. Blanton, M. A. Strauss, F. Hoyle, D. Schlegel, R. Scoccimarro, M. S. Vogeley, D. H. Weinberg, I. Zehavi, A. Berlind, T. Budavari, A. Connolly, D. J. Eisenstein, D. Finkbeiner, J. A. Frieman, J. E. Gunn, A. J. S. Hamilton, L. Hui, B. Jain, D. Johnston, S. Kent, H. Lin, R. Nakajima, R. C. Nichol, J. P. Ostriker, A. Pope, R. Scranton, U. Seljak, R. K. Sheth, A. Stebbins, A. S. Szalay, I. Szapudi, L. Verde, Y. Xu, J. Annis, N. A. Bahcall, J. Brinkmann, S. Burles, F. J. Castander, I. Csabai, J. Loveday, M. Doi, M. Fukugita, J. R. Gott, III, G. Hennessy, D. W. Hogg, Ž. Ivezić, G. R. Knapp, D. Q. Lamb, B. C. Lee, R. H. Lupton, T. A. McKay, P. Kunszt, J. A. Munn, L. O'Connell, J. Peoples, J. R. Pier, M. Richmond, C. Rockosi, D. P. Schneider, C. Stoughton, D. L. Tucker, D. E. Vanden Berk, B. Yanny, D. G. York, SDSS Collaboration, *The Three-Dimensional Power Spectrum of Galaxies from the Sloan Digital Sky Survey*, *Astrophysical Journal* **606**, 702 (2004), astro-ph/0310725.
- ([Tempel, Stoica & Saar, 2013](#)) E. Tempel, R. S. Stoica, E. Saar, *Evidence for spin alignment of spiral and elliptical/S0 galaxies in filaments*, *Monthly Notices of the Royal Astronomical Society* **428**, 1827 (2013), arXiv:1207.0068 [astro-ph.CO].
- ([Tempel et al., 2014](#)) E. Tempel, R. S. Stoica, V. J. Martínez, L. J. Liivamägi, G. Castellan, E. Saar, *Detecting filamentary pattern in the cosmic web: a catalogue of filaments for the SDSS*, *Monthly Notices of the Royal Astronomical Society* **438**, 3465 (2014), arXiv:1308.2533 [astro-ph.CO].
- ([Teyssier, 2014](#)) R. Teyssier, *Computational cosmology*, in *Lecture Notes of the Les Houches Summer School "Post-Planck Cosmology": Volume 100, July 2013*, edited by C. Deffayet, P. Peter, B. Wandelt, M. Zaldarriaga, L. F. Cugliandolo (2014).
- ([Tinker & Conroy, 2009](#)) J. L. Tinker, C. Conroy, *The Void Phenomenon Explained*, *Astrophysical Journal* **691**, 633 (2009), arXiv:0804.2475.
- ([Tolkien, 1954](#)) J. R. R. Tolkien, *The Lord of the Rings – The Fellowship of the Ring* (George Allen & Unwin, 1954).
- ([Trodden & Carroll, 2004](#)) M. Trodden, S. M. Carroll, *TASI Lectures: Introduction to Cosmology*, *Astronomy* (2004), arXiv:astro-ph/0401547.
- ([Trotta, 2008](#)) R. Trotta, *Bayes in the sky: Bayesian inference and model selection in cosmology*, *Contemporary Physics* **49**, 71 (2008), arXiv:0803.4089.
- ([Valageas, 2007](#)) P. Valageas, *Large- N expansions applied to gravitational clustering*, *Astronomy and Astrophysics* **465**, 725 (2007), astro-ph/0611849.
- ([Valageas & Bernardeau, 2011](#)) P. Valageas, F. Bernardeau, *Density fields and halo mass functions in the geometrical adhesion toy model*, *Physical Review D* **83**, 043508 (2011), arXiv:1009.1974 [astro-ph.CO].
- ([van de Weygaert & Schaap, 2009](#)) R. van de Weygaert, W. Schaap, *The Cosmic Web: Geometric Analysis, in Data Analysis in Cosmology*, Lecture Notes in Physics, Berlin Springer Verlag, Vol. 665, edited by V. J. Martínez, E. Saar, E. Martínez-González, M.-J. Pons-Bordería (2009) pp. 291–413.
- ([van de Weygaert & Platen, 2011](#)) R. van de Weygaert, E. Platen, *Cosmic Voids: Structure, Dynamics and Galaxies*, *International Journal of Modern Physics Conference Series* **1**, 41 (2011), arXiv:0912.2997 [astro-ph.CO].
- ([van de Weygaert & van Kampen, 1993](#)) R. van de Weygaert, E. van Kampen, *Voids in Gravitational Instability Scenarios - Part One - Global Density and Velocity Fields in an Einstein - De-Sitter Universe*, *Monthly Notices of the Royal Astronomical Society* **263**, 481 (1993).
- ([van de Weygaert & Bertschinger, 1996](#)) R. van de Weygaert, E. Bertschinger, *Peak and gravity constraints in Gaussian primordial density fields: An application of the Hoffman-Ribak method*, *Monthly Notices of the Royal Astronomical Society* **281**, 84 (1996), astro-ph/9507024.

- (Verde, 2010) L. Verde, *Statistical Methods in Cosmology*, in *Lecture Notes in Physics, Berlin Springer Verlag*, Lecture Notes in Physics, Berlin Springer Verlag, Vol. 800, edited by G. Wolschin (2010) pp. 147–177, arXiv:0911.3105.
- (Verde *et al.*, 1998) L. Verde, A. F. Heavens, S. Matarrese, L. Moscardini, *Large-scale bias in the Universe - II. Redshift-space bispectrum*, *Monthly Notices of the Royal Astronomical Society* **300**, 747 (1998), astro-ph/9806028.
- (Verde *et al.*, 2002) L. Verde, A. F. Heavens, W. J. Percival, S. Matarrese, C. M. Baugh, J. Bland-Hawthorn, T. Bridges, R. Cannon, S. Cole, M. Colless, C. Collins, W. Couch, G. Dalton, R. De Propris, S. P. Driver, G. Efstathiou, R. S. Ellis, C. S. Frenk, K. Glazebrook, C. Jackson, O. Lahav, I. Lewis, S. Lumsden, S. Maddox, D. Madgwick, P. Norberg, J. A. Peacock, B. A. Peterson, W. Sutherland, K. Taylor, *The 2dF Galaxy Redshift Survey: the bias of galaxies and the density of the Universe*, *Monthly Notices of the Royal Astronomical Society* **335**, 432 (2002), arXiv:astro-ph/0112161.
- (Verdinelli & Wasserman, 1995) I. Verdinelli, L. Wasserman, *Computing Bayes Factors Using a Generalization of the Savage-Dickey Density Ratio*, *Journal of the American Statistical Association* **90**, 614 (1995).
- (Verleysen & François, 2005) M. Verleysen, D. François, *The curse of dimensionality in data mining and time series prediction*, in *Computational Intelligence and Bioinspired Systems* (Springer, 2005) pp. 758–770.
- (Vettolani *et al.*, 1997) G. Vettolani, E. Zucca, G. Zamorani, A. Cappi, R. Merighi, M. Mignoli, G. M. Stirpe, H. MacGillivray, C. Collins, C. Balkowski, V. Cayatte, S. Maurogordato, D. Proust, G. Chincarini, L. Guzzo, D. Maccagni, R. Scaramella, A. Blanchard, M. Ramella, *The ESO Slice Project (ESP) galaxy redshift survey. I. Description and first results.*, *Astronomy and Astrophysics* **325**, 954 (1997), astro-ph/9704097.
- (Viel, Colberg & Kim, 2008) M. Viel, J. M. Colberg, T.-S. Kim, *On the importance of high-redshift intergalactic voids*, *Monthly Notices of the Royal Astronomical Society* **386**, 1285 (2008), arXiv:0801.1105.
- (Vogelsberger *et al.*, 2014) M. Vogelsberger, S. Genel, V. Springel, P. Torrey, D. Sijacki, D. Xu, G. Snyder, S. Bird, D. Nelson, L. Hernquist, *Properties of galaxies reproduced by a hydrodynamic simulation*, *Nature* **509**, 177 (2014), arXiv:1405.1418.
- (Wandelt, 2013) B. D. Wandelt, *Astrostatistical Challenges for the New Astronomy* (Springer, 2013) Chap. Gaussian Random Fields in Cosmostatistics, pp. 87–105.
- (Wandelt, Larson & Lakshminarayanan, 2004) B. D. Wandelt, D. L. Larson, A. Lakshminarayanan, *Global, exact cosmic microwave background data analysis using Gibbs sampling*, *Physical Review D* **70**, 083511 (2004), astro-ph/0310080.
- (Wang *et al.*, 2012) H. Wang, H. J. Mo, X. Yang, F. C. van den Bosch, *Reconstructing the cosmic velocity and tidal fields with galaxy groups selected from the Sloan Digital Sky Survey*, *Monthly Notices of the Royal Astronomical Society* **420**, 1809 (2012), arXiv:1108.1008 [astro-ph.CO].
- (Wang *et al.*, 2013) H. Wang, H. J. Mo, X. Yang, F. C. van den Bosch, *Reconstructing the Initial Density Field of the Local Universe: Methods and Tests with Mock Catalogs*, *Astrophysical Journal* **772**, 63 (2013), arXiv:1301.1348 [astro-ph.CO].
- (Weinberg, 1992) D. H. Weinberg, *Reconstructing primordial density fluctuations. I - Method*, *Monthly Notices of the Royal Astronomical Society* **254**, 315 (1992).
- (Weinberg & Gunn, 1990) D. H. Weinberg, J. E. Gunn, *Large-scale Structure and the Adhesion Approximation*, *Monthly Notices of the Royal Astronomical Society* **247**, 260 (1990).
- (Welker *et al.*, 2014) C. Welker, J. Devriendt, Y. Dubois, C. Pichon, S. Peirani, *Mergers drive spin swings along the cosmic web*, *Monthly Notices of the Royal Astronomical Society* **445**, L46 (2014), arXiv:1403.2728 [astro-ph.CO].
- (Weyant, Schafer & Wood-Vasey, 2013) A. Weyant, C. Schafer, W. M. Wood-Vasey, *Likelihood-free Cosmological Inference with Type Ia Supernovae: Approximate Bayesian Computation for a Complete Treatment of Uncertainty*, *Astrophysical Journal* **764**, 116 (2013), arXiv:1206.2563 [astro-ph.CO].

- (White & Rees, 1978) S. D. M. White, M. J. Rees, *Core condensation in heavy halos - A two-stage theory for galaxy formation and clustering*, Monthly Notices of the Royal Astronomical Society **183**, 341 (1978).
- (Wolpert & Macready, 1997) D. H. Wolpert, W. G. Macready, *No free lunch theorems for optimization*, IEEE Transactions on Evolutionary Computation **1**, 67 (1997).
- (Wolstenhulme, Bonvin & Obreschkow, 2015) R. Wolstenhulme, C. Bonvin, D. Obreschkow, *Three-point Phase Correlations: A New Measure of Non-linear Large-scale Structure*, Astrophysical Journal **804**, 132 (2015), arXiv:1409.3007.
- (Yan, Fan & White, 2012) H. Yan, Z. Fan, S. D. M. White, *On the Tidal Dependence of Galaxy Properties*, ArXiv e-prints (2012), arXiv:1203.1225 [astro-ph.GA].
- (York *et al.*, 2000) D. G. York, J. Adelman, J. E. Anderson, Jr., et al., *The Sloan Digital Sky Survey: Technical Summary*, Astronomical Journal **120**, 1579 (2000), astro-ph/0006396.
- (Yoshisato *et al.*, 2006) A. Yoshisato, M. Morikawa, N. Gouda, H. Mouri, *Why is the Zel'dovich Approximation So Accurate?*, Astrophysical Journal **637**, 555 (2006), astro-ph/0510107.
- (Yu *et al.*, 2011) Y. Yu, P. Zhang, W. Lin, W. Cui, J. N. Fry, *Gaussianizing the non-Gaussian lensing convergence field: The performance of the Gaussianization*, Physical Review D **84**, 023523 (2011), arXiv:1103.2858 [astro-ph.CO].
- (Yu *et al.*, 2012) Y. Yu, P. Zhang, W. Lin, W. Cui, J. N. Fry, *Gaussianizing the non-Gaussian lensing convergence field II. The applicability to noisy data*, Physical Review D **86**, 023515 (2012), arXiv:1201.4527 [astro-ph.CO].
- (Zaroubi, 2002) S. Zaroubi, *Unbiased reconstruction of the large-scale structure*, Monthly Notices of the Royal Astronomical Society **331**, 901 (2002), astro-ph/0010561.
- (Zel'dovich & Novikov, 1983) I. B. Zel'dovich, I. D. Novikov, *Chicago, IL, University of Chicago Press, 1983, 751 p. Translation.* (University of Chicago Press, 1983).
- (Zel'dovich, Einasto & Shandarin, 1982) I. B. Zel'dovich, J. Einasto, S. F. Shandarin, *Giant voids in the universe*, Nature **300**, 407 (1982).
- (Zel'dovich, 1970) Y. B. Zel'dovich, *Gravitational instability: An approximate theory for large density perturbations*, Astronomy and Astrophysics **5**, 84 (1970).
- (Zhang *et al.*, 2009) Y. Zhang, X. Yang, A. Faltenbacher, V. Springel, W. Lin, H. Wang, *The Spin and Orientation of Dark Matter Halos Within Cosmic Filaments*, Astrophysical Journal **706**, 747 (2009), arXiv:0906.1654 [astro-ph.GA].
- (Zhang *et al.*, 2013) Y. Zhang, X. Yang, H. Wang, L. Wang, H. J. Mo, F. C. van den Bosch, *Alignments of Galaxies within Cosmic Filaments from SDSS DR7*, Astrophysical Journal **779**, 160 (2013), arXiv:1309.3847 [astro-ph.CO].
- (Zhao *et al.*, 2015) C. Zhao, F.-S. Kitaura, C.-H. Chuang, F. Prada, G. Yepes, C. Tao, *Halo mass distribution reconstruction across the cosmic web*, Monthly Notices of the Royal Astronomical Society **451**, 4266 (2015), arXiv:1501.05520.