

Publication List

— Thomas Buchert

Date : January 7, 2025

ADS Citations : Total : 8345 ; normalized per author : 4000

h-INDEX : h=46 TORI-INDEX : tori=83,3

Citations per year : (averaged over the past five years) : $\cong 600$

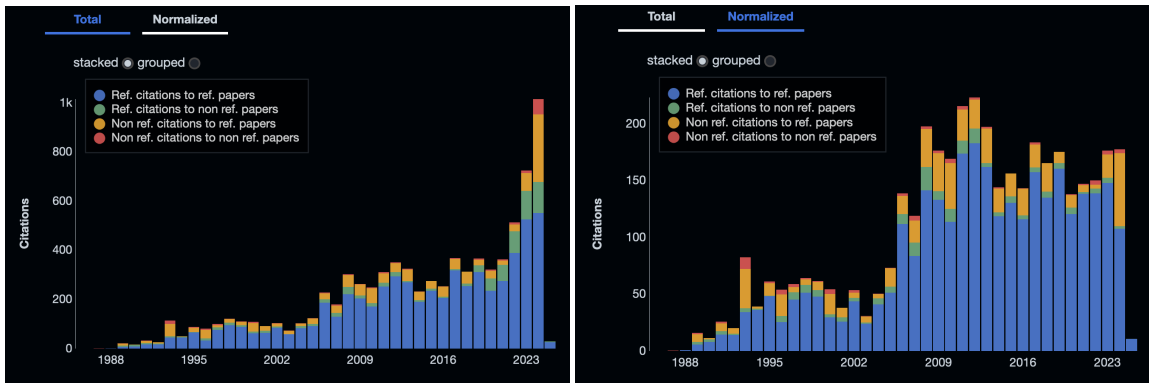


FIGURE 1 – Citations per year (total and normalized per number of authors) — courtesy of ADS

Peer-reviewed Articles

1. Buchert T., Götz G. : ‘A class of solutions for self-gravitating dust in Newtonian gravity’, *J. Math. Phys.* **28**, 2714-2719 (1987).
2. Buchert T. : ‘A class of solutions in Newtonian cosmology and the pancake theory’, *Astron. Astrophys.* **223**, 9-24 (1989).
3. Mo H.J., Buchert T. : ‘A statistical discriminator among galaxy samples of different large-scale topology and geometry’, *Astron. Astrophys.* **234**, 5-19 (1990).
4. Buchert T., Mo H.J. : ‘Probing pencil beams in pancake models’, *Astron. Astrophys.* **249**, 307-311 (1991).
5. Buchert T., Bartelmann M. : ‘High-spatial resolution in three dimensions : a challenge for large-scale structure formation models’, *Astron. Astrophys.* **251**, 389-392 (1991).
6. Bildhauer S., Buchert T. : ‘The relation between peculiar-velocity and density parameter for a class of solutions in Newtonian cosmology’, *Prog. Theor. Phys.* **86**, 653-658 (1991).
7. Buchert T. : ‘Lagrangian theory of gravitational instability of Friedmann-Lemaître cosmologies and the “Zel’dovich approximation” ’, *M.N.R.A.S.* **254**, 729-737 (1992).

8. Bildhauer S., Buchert T., Kasai M. : ‘Solutions in Newtonian cosmology – the pancake theory with cosmological constant’,
Astron. Astrophys. **263**, 23-29 (1992).
9. Blanchard A., Buchert T., Klaffl R. : ‘Can the neutrino picture be revived? – QSO constraints revisited’,
Astron. Astrophys. **267**, 1-10 (1993).
10. Buchert T., Martínez V.J. : ‘The two–point correlation function in pancake models and the fair sample hypothesis’,
The Astrophysical Journal **411**, 485-500 (1993).
11. Buchert T. : ‘Lagrangian perturbation theory – a key–model for large–scale structure’,
Astron. Astrophys. **267**, L51-L54 (1993).
12. Weiss A.G., Buchert T. : ‘High resolution simulation of deep pencilbeam surveys – analysis of quasi–periodicity’,
Astron. Astrophys. **274**, 1-11 (1993).
13. Buchert T., Ehlers J. : ‘Lagrangian theory of gravitational instability of Friedmann–Lemaître cosmologies – second–order approach : an improved model for nonlinear clustering’,
M.N.R.A.S. **264**, 375-387 (1993).
14. Buchert T. : ‘Lagrangian theory of gravitational instability of Friedmann–Lemaître cosmologies – a generic third–order model for nonlinear clustering’,
M.N.R.A.S. **267**, 811-820 (1994).
15. Buchert T., Melott A.L., Weiss A.G. : ‘Testing higher–order Lagrangian perturbation theory against numerical simulations – 1. Pancake models’,
Astron. Astrophys. **288**, 349-364 (1994).
16. Mecke K.R., Buchert T., Wagner H. : ‘Robust morphological measures for large–scale structure in the Universe’,
Astron. Astrophys. **288**, 697-704 (1994).
17. Melott A.L., Buchert T., Weiss A.G. : ‘Testing higher–order Lagrangian perturbation theory against numerical simulations – 2. Hierarchical models’,
Astron. Astrophys. **293**, 641-651 (1995).
18. Weiss A.G., Gottlöber S., Buchert T. : ‘Optimizing higher–order Lagrangian perturbation theory for Standard CDM and BSI models’,
M.N.R.A.S. **278**, 953-964 (1996).
19. Buchert T., Ehlers J. : ‘Averaging inhomogeneous Newtonian cosmologies’,
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20. Buchert T., Karakatsanis G., Klaffl R., Schiller P. : ‘The performance of Lagrangian perturbation schemes at high resolution’,
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21. Susperregi M., Buchert T. : ‘Cosmic density and velocity fields in Lagrangian perturbation theory’,
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22. Karakatsanis G., Buchert T., Melott A.L. : ‘Temporal optimization of Lagrangian perturbation schemes’,
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23. Kerscher M., Schmalzing J., Retzlaff J., Borgani S., Buchert T., Gottlöber S., Müller V., Plionis M., Wagner H. : ‘Minkowski-Functionals of Abell / ACO clusters’,
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25. Schmalzing J., Buchert T. : ‘Beyond genus statistics : a unifying approach to the morphology of cosmic structure’,
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27. Buchert T., Domínguez A. : ‘Modeling multi-stream flow in collisionless matter : approximations for large-scale structure beyond shell-crossing’,
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Astron. Astrophys. **349**, 343-353 (1999).
29. Kerscher M., Pons-Borderia M.-J., Schmalzing J., Trasarti-Battistoni R., Buchert T., Martínez V.J., Valdarnini R. : ‘A global descriptor of spatial pattern interaction in the galaxy distribution’,
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31. Adler S., Buchert T. : ‘Lagrangian theory of structure formation in pressure-supported cosmological fluids’,
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32. Schmalzing J., Buchert T., Melott A.L., Sahni V., Sathyaprakash B.S., Shandarin S.F. : ‘Disentangling the cosmic web I : morphology of isodensity contours’,
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33. Buchert T. : ‘On average properties of inhomogeneous fluids in general relativity I : dust cosmologies’,
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34. Buchert T., Kerscher M., Sicka C. : ‘Backreaction of inhomogeneities on the expansion : the evolution of cosmological parameters’,
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35. Beisbart C., Buchert T., Wagner H. : ‘Morphometry of spatial patterns’,
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36. Kerscher M., Mecke K.R., Schmalzing J., Beisbart C., Buchert T., Wagner H. : ‘Morphological fluctuations of large-scale structure : the PSCz survey’,
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37. Buchert T. : ‘On average properties of inhomogeneous fluids in general relativity II : perfect fluid cosmologies’,
Gen. Rel. Grav. **33**, 1381-1405 (2001).
38. Kerscher M., Buchert T., Futamase T. : ‘On the abundance of collapsed objects’,
The Astrophysical Journal **558**, L79-L82 (2001).
39. Beisbart C., Valdarnini R., Buchert T. : ‘The morphological and dynamical evolution of simulated galaxy clusters’,
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40. Buchert T., Carfora M. : ‘Regional averaging and scaling in relativistic cosmology’,
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48. Buchert T. : ‘On globally static and stationary cosmologies with or without a cosmological constant and the Dark Energy problem’,
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50. Buchert T. : ‘The non-perturbative regime of cosmic structure formation’,
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51. Buchert T., Larena J., Alimi J.–M. : ‘Correspondence between kinematical backreaction and scalar field cosmologies – the ‘morphon field’’,
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53. Buchert T., Carfora M. : ‘On the curvature of the present–day Universe’,
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58. Wiegand A., Buchert T. : ‘Multiscale cosmology and structure–emerging Dark Energy : a plausibility analysis’.
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59. Buchert T., Obadia N. : ‘Effective Inhomogeneous Inflation : curvature inhomogeneities of the Einstein vacuum’.
Class. Quant. Grav. F.T.C. **28**, 162002 (2011).
60. Roy X., Buchert T., Carloni S., Obadia N. : ‘Global gravitational instability of FLRW backgrounds — interpreting the dark sectors’.
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61. Buchert T. : ‘Toward physical cosmology : focus on inhomogeneous geometry and its non–perturbative effects’ ; invited review.
Class. Quant. Grav. (Focus section on ‘inhomogeneous cosmological models and averaging in cosmology’) **28**, 164007 (2011).
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63. Rampf C., Buchert T. : ‘Lagrangian perturbations and the matter bispectrum I : fourth–order model for nonlinear clustering’.
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64. Buchert T., Ostermann M. : ‘Lagrangian theory of structure formation in relativistic cosmology. I. Lagrangian framework and definition of a nonperturbative approximation’.
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65. Li N., Buchert T., Hosoya A., Morita M., Schwarz D.J. : ‘Relative information entropy and Weyl curvature of the inhomogeneous Universe’.
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66. Buchert T., Räsänen S. : ‘Backreaction in late–time cosmology’ ; invited review.
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69. Roukema B.F., France M.J., Kazimierczak T.A., Buchert T. : ‘Deep redshift topological lensing : strategies for the T^3 candidate’.
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76. Roukema B.F., Mourier P., Buchert T., Ostrowski J.J. : ‘The background Friedmannian Hubble constant in relativistic inhomogeneous cosmology and the age of the Universe’.
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77. Buchert T., France M.J., Steiner F. : ‘Model–independent analyses of non–Gaussianity in Planck CMB maps using Minkowski Functionals’ ; invited article.

- Class. Quant. Grav.* (Focus section on 'Planck and fundamentals of cosmology') **34**, 094002 (2017).
78. Al Roumi F., Buchert T., Wiegand A. : 'Lagrangian theory of structure formation in relativistic cosmology. IV. Lagrangian approach to gravitational waves'.
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 79. Buchert T. : 'On Backreaction in Newtonian cosmology'.
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 80. Li Y.-Z., Mourier P., Buchert T., Wiltshire D.L. : 'Lagrangian theory of structure formation in relativistic cosmology. V. Irrotational fluids'.
Phys. Rev. D **98**, 043507 (2018).
 81. Buchert T., Mourier P., Roy X. : 'Cosmological backreaction and its dependence on spacetime foliation'.
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 82. Heinesen A., Mourier P., Buchert T. : 'On the covariance of scalar averaging and backreaction in relativistic inhomogeneous cosmology'.
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 83. Pranav P., van de Weygaert R., Vegter G., Jones B.J.T., Adler R.J., Feldbrugge J., Park C., Buchert T., Kerber M. : 'Topology and Geometry of Gaussian random fields I : on Betti Numbers, Euler characteristic and Minkowski functionals'.
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 84. Pranav P., Adler R.J., Buchert T., Edelsbrunner H., Jones B.J.T., Schwartzmann A., Wagner H., van de Weygaert R. : 'Unexpected Topology of the Temperature Fluctuations in the Cosmic Microwave Background'.
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 85. Desgrange C., Heinesen A., Buchert T. : 'Dynamical spatial curvature as a fit to type Ia supernovae'.
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 86. Vigneron Q., Buchert T. : 'Dark Matter from Backreaction? Collapse models on galaxy cluster scales'.
Class. Quant. Grav. **36**, 175006 (2019).
 87. Buchert T., Mädler T. : 'Editorial Note to : On the Newtonian limit of Einstein's theory of gravitation (by Jürgen Ehlers)'.
Gen. Rel. Grav. **51**, 162 (2019).
 88. Buchert T., Mourier P., Roy X. : 'On average properties of inhomogeneous fluids in general relativity III : General fluid cosmologies'.
Gen. Rel. Grav. **52**, 27 (2020).
 89. Heinesen A., Buchert T. : 'Solving the curvature and Hubble parameter inconsistencies through structure formation-induced curvature'.
Class. Quant. Grav. **37**, 164001 (2020).
 90. Brunswic L., Buchert T. : 'Gauss-Bonnet-Chern approach to the averaged Universe'.
Class. Quant. Grav. **37**, 215022 (2020).

91. Delgado Gaspar I., Buchert T. : ‘Lagrangian theory of structure formation in relativistic cosmology. VI. Comparison with Szekeres exact solutions’.
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92. Aurich R., Buchert T., France M.J., Steiner F. : ‘The variance of the CMB temperature gradient : a new signature of a multiply connected Universe’.
Class. Quant. Grav. **38**, 225005 (2021).
93. Appleby S., Park C., Pranav P., Hong S.E., Hwang H.S., Kim J., Buchert T. : ‘Minkowski Functionals of SDSS-III BOSS : Hints of Possible Anisotropy in the Density Field?’
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94. Abdalla E., *et al.* SNOWMASS collaboration : ‘Cosmology intertwined : A review of the particle physics, astrophysics, and cosmology associated with the cosmological tensions and anomalies’.
JHEAp **34**, 49 (2022).
95. Buchert T., Delgado Gaspar I., Ostrowski J.J. : ‘On general-relativistic Lagrangian perturbation theory and its non-perturbative generalization’.
Universe **8**, 583 (2022).
96. Buchert T., van Elst, H., Heinesen A. : ‘The averaging problem on the past null cone in inhomogeneous dust cosmologies’.
Gen. Rel. Grav. **55**, 7 (2023).
97. Delgado Gaspar I., Buchert T., Ostrowski J.J. : ‘Beyond relativistic Lagrangian perturbation theory. I. An exact-solution controlled model for structure formation’.
Phys. Rev. D **107**, 024018 (2023).
98. Fardeau N., Buchert T., Al Roumi F., Felegary F. : ‘Non-perturbative collapse models for collisionless self-gravitating flows’.
Phys. Rev. D **108**, 083502 (2023).
99. Buchert T. : ‘Direct correspondence between Newtonian gravitation and general relativity’.
Phys. Rev. D **108**, L101502 (2023).
100. Pranav P., Buchert T. : ‘Homology reveals significant anisotropy in the cosmic microwave background’.
Astron. Astrophys. **xxx**, to be published (2025).

Invited Papers and Workshop Contributions

1. Buchert T. : ‘Analytical models for large–scale structure in the Universe’, in : IAP Workshop, Paris (France) *The World of Galaxies*, H.G. Corwin, L. Bottinelli (eds.), 473–476 (1989).
2. Buchert T. : ‘Lighting up pancakes – Towards a theory of galaxy formation’, Astronomical Society, ‘Highlight-talk’, Graz (Austria), *Rev. Mod. Astron.* **2**, 267–281 (1989).
3. Buchert T., Mo H.J. : ‘Statistical discriminators of large–scale structure’, in : *Progress report on cosmology and gravitational lensing*, Ringberg, Tegernsee (Germany), Proceedings MPA/P3, G. Börner, T. Buchert, P. Schneider (eds.), 17–23 (1989).
4. Buchert T., Schiller P. : ‘The peculiar–velocity field in pancake models’, in : *Progress report on cosmology and gravitational lensing*, Proceedings MPA/P3, Ringberg, Tegernsee (Germany), G. Börner, T. Buchert, P. Schneider (eds.), 158–162 (1989).
5. Klaffl R., Buchert T., Einasto J. Kates R., Saar E. : ‘Cosmography of the Virgo, Coma and Perseus superclusters’, in : *Progress report on cosmology and gravitational lensing*, Proceedings MPA/P3, Ringberg, Tegernsee (Germany), G. Börner, T. Buchert, P. Schneider (eds.), 144 (a movie) (1989).
6. Buchert T. : ‘Lighting up pancakes – Towards a theory of galaxy formation’, in : *Progress report on cosmology and gravitational lensing*, Proceedings MPA/P3, Ringberg, Tegernsee (Germany), G. Börner, T. Buchert, P. Schneider (eds.), 1–16 (1989).
7. Buchert T., Klaffl R. : ‘Illustrations of two– and three–dimensional pancaking’, in : *Dark Matter in the Universe*, Erice (Italy), P. Galeotti, D.N. Schramm (eds.), Kluwer Acad. Pub., 93–98 (1990).
8. Buchert T., Klaffl R. : ‘Illustrations of two- and three-dimensional pancaking’, in : *Dark Matter in the Universe*, Third Nishinomiya–Yukawa Memorial Symposium, Nishinomiya 1988 (Japan), H. Sato, H. Kodama (eds.), Springer Berlin, N.Y. NATO Advanced Science Institutes, ASI Series C, Volume 296, 93 (1990).
9. Buchert T. : ‘High–spatial resolution of pancakes’, IAU Workshop Tenerife (Spain), *Astrophys. Sp. Sci.* **171**, 135–139 (1990).
10. Buchert T. : ‘Galaxy formation in pancake models’, IAU Workshop Tenerife (Spain), *Astrophys. Sp. Sci.* **171**, 141–145 (1990).
11. Buchert T., Klaffl R. : ‘Three–dimensional realizations of dynamically thresholded pancake models’, in : Rencontres de Blois (France) *Physical Cosmology*, A. Blanchard et al. (eds.), Frontières Paris, 591–594 (1991).
12. Buchert T. : ‘Dynamical thresholding of pancake models : 1. Dynamical thresholding; 2. The two–point correlation function; 3. Large 2D realizations and subsampling’, in : Rencontres de Blois (France) *Physical Cosmology*, A. Blanchard et al. (eds.), Frontières Paris, 475–483 (1991).
13. Buchert T. : ‘Dynamical thresholding of pancake models : A promising variant of the HDM picture’, in : Proc. 3rd MPG–CAS Workshop on *High Energy Astrophysics – Com-*

- pact Stars and Active Galaxies*, Huangshan (PR China), ed. : Li Qibin, World Scientific, Singapore, 242–252 (1991).
14. Buchert T., Bartelmann M. : ‘High–spatial resolution of pancakes in 3D’, in : 2nd. DAEC meeting Meudon (France) *Distribution of Matter in the Universe*, G. Mamon, D. Gerbal (eds.), Meudon : Observatoire de Paris, 277–280 (1992).
 15. Buchert T. : ‘Vorticity in pancake models’, in : 2nd. DAEC meeting Meudon (France) *Distribution of Matter in the Universe*, G. Mamon, D. Gerbal (eds.), Meudon : Observatoire de Paris, 281–286 (1992).
 16. Buchert T., Martínez V.J. : ‘What is a fair sample?’, in : *Observational Cosmology*, Chincarini G. et al. (eds.), ASP Conference Series Vol. **51**, 72–73 (1993).
 17. Buchert T., Weiss A.G. : ‘Third–order Lagrangian perturbation theory – realization at high–spatial resolution’, in : 9th IAP conference Paris (France) *Cosmic Velocity Fields*, F. Bouchet, M. Lachièze–Rey (eds.), Frontières Paris, 517–519 (1993).
 18. Buchert T. : ‘Higher–order Lagrangian perturbation theory’, in : *Proceedings 4th MPG–CAS Workshop on High–energy astrophysics and Cosmology*, Ringberg, Tegernsee (Germany), Proceedings MPA/P8, G. Börner, T. Buchert (eds.), 204–214 (1993).
 19. Weiss A.G., Buchert T. : ‘High–resolution simulation of deep pencil beam surveys’, in : *Proceedings 4th MPG–CAS Workshop on High–energy astrophysics and Cosmology*, Ringberg, Tegernsee (Germany), Proceedings MPA/P8, G. Börner, T. Buchert (eds.), 310–318 (1993).
 20. Buchert T. : ‘Cosmogony of generic structures’, in : *Galaxy formation and large–scale structure of the Universe – The coming decade*, Nandaihe (PR China), Z.-L. Zou, Y. Chen, P.-W. Ji (eds.), *Astrophysics Reports* **1**, Pub. Beijing Astron. Obs., 59–70 (1995).
 21. Platzöder M., Buchert T. : ‘Application of Minkowski functionals to the statistical analysis of dark matter models’, in : *1st SFB workshop on Astro–particle physics*, Report SFB/P001, Ringberg, Tegernsee, (Germany), A. Weiss, G. Raffelt, W. Hillebrandt, F.v. Feilitzsch (eds.), 251–263 (1995).
 22. Buchert T. : ‘Robust morphological measures for large–scale structure’, in : *11th Potsdam Cosmology Workshop on Large–scale Structure in the Universe*, Geltow (Germany), J. Mückel, S. Gottlöber, V. Müller (eds.), World Scientific, 156–161 (1995).
 23. Buchert T., Melott A.L., Weiss A.G. : ‘Optimized Lagrangian approximations for modelling large–scale structure at nonlinear stages’, in : *11th Potsdam Cosmology Workshop on Large–scale Structure in the Universe*, Geltow (Germany), J. Mückel, S. Gottlöber, V. Müller (eds.), World Scientific, 364–368 (1995).
 24. Buchert T. : ‘Averaging hypotheses in Newtonian cosmology’, in : *Mapping, Measuring and Modelling the Universe*, València (Spain) 1995, P. Coles, V.J. Martínez, M.J. Pons (eds.), ASP Conference Series 94, 349–356 (1996).
 25. Weiss A.G., Gottlöber S., Buchert T. : ‘Optimizing higher–order Lagrangian perturbation theory for Cold Dark Matter models’, in : *Mapping, Measuring and Modelling the Universe*, València (Spain) 1995, P. Coles, V.J. Martínez, M.J. Pons (eds.), ASP Conference Series 94, 13–18 (1996).

26. Kerscher M., Schmalzing J., Buchert T. : ‘Analyzing galaxy catalogues with Minkowski Functionals’, in : *Mapping, Measuring and Modelling the Universe*, València (Spain) 1995, P. Coles, V.J. Martínez, M.J. Pons (eds.), ASP Conference Series 94, 247–252 (1996).
27. Buchert T. : ‘Lagrangian perturbation approach to the formation of large–scale structure’, in : *Proc. International School Enrico Fermi, Course CXXXII (Dark Matter in the Universe)*, Varenna (Italy), S. Bonometto, J.R. Primack, A. Provenzale (eds.), IOS Press Amsterdam, 543–564 (1996).
28. Schmalzing J., Kerscher M., Buchert T. : ‘Minkowski functionals in cosmology’, in : *Proc. International School Enrico Fermi, Course CXXXII (Dark Matter in the Universe)*, Varenna (Italy), S. Bonometto, J.R. Primack, A. Provenzale (eds.), IOS Press Amsterdam, 281–291 (1996).
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