

Bibliography

The entries are listed in order of appearance in the text

- [1] Ernst Mach, *The science of mechanics*. Open Court Publishing 1974. (First edition: Ernst Mach, *Die Mechanik in ihrer Entwicklung historisch-kritisch Dargestellt*, 1883).
- [2] U. J. Le Verrier, *Ann. de l'Obs. de Paris* **5**, 104 (1859); cited after [3].
- [3] R. H. Dicke, *The theoretical significance of experimental relativity*. Gordon and Breach, New York 1964.
- [4] C. M. Will, *Theory and experiment in gravitational physics*. Cambridge University Press 1981.
- [5] J. Mehra, *Einstein, Hilbert and the theory of gravitation*. D. Reidel, Dordrecht 1974.
- [6] A. Einstein, H. A. Lorentz, H. Weyl and H. Minkowski, *The principle of relativity. A collection of original papers on the special and general theory of relativity*. Dover Publications 1923.
- [7] L. P. Eisenhart, *An introduction to differential geometry with use of tensor calculus*. Princeton University Press, Princeton 1940.
- [8] L. P. Eisenhart, *Riemannian geometry*. Princeton University Press, Princeton 1964.
- [9] H. Stephani, *General Relativity*. Second edition. Cambridge University Press, Cambridge 1990.
- [10] A. Krasiński, in *10th International Conference on General Relativity and Gravitation*. Abstracts of contributed papers. Edited by F. de Felice and A. Pascolini. University of Padua 1983, p. 290.
- [11] J. Plebański and A. Krasiński, *An introduction to general relativity and cosmology*. Cambridge University Press 2006, 534 pp, ISBN 0-521-85623-X. Paperback re-edition 2012.
- [12] W. Ślebodziński, *Bulletins de la Classe des Sciences , Acad. Royale de Belg.* (5) **17**, 864 (1931). Reprinted in *Gen. Relativ. Gravit.* **42**, no 10, 2529 (2010), with an editorial

- note by A. Trautman, *Gen. Relativ. Gravit.* **42**, 2525 (2010) and author's biography by W. Roter, *Gen. Relativ. Gravit.* **42**, 2527 (2010).
- [13] J. A. Schouten and E. R. van Kampen, *Prace Matematyczno-Fizyczne* **41**, 1 (1934). [Note: In citations of this paper, even by Schouten himself, the title of the journal and the date of publication are distorted. The citation here is correct.]
 - [14] J. A. Schouten and D. J. Struik, *Einführung in die neueren Methoden der Differentialgeometrie*, Band 1. P. Noordhoff N. V., Groningen - Batavia 1935, p. 142.
 - [15] R. Kantowski and R. K. Sachs, *J. Math. Phys.* **7**, 443 (1966).
 - [16] W. de Sitter, *Mon. Not. Roy. Astr. Soc.* **78**, 3 (1917).
 - [17] W. Kundt, *Gen. Relativ. Gravit.* **35**, 491 (2003).
 - [18] A. Krasiński, C. G. Behr, E. Schücking, F. B. Estabrook, H. D. Wahlquist, G. F. R. Ellis, R. Jantzen and W. Kundt, *Gen. Relativ. Gravit.* **35**, 475 (2003).
 - [19] F. B. Estabrook, H. D. Wahlquist and C. G. Behr, *J. Math. Phys.* **9**, 497 (1968).
 - [20] G. F. R. Ellis and M. A. H. MacCallum, *Commun. Math. Phys.* **12**, 108 (1969).
 - [21] G. F. R. Ellis and M. A. H. MacCallum, *Commun. Math. Phys.* **19**, 31 (1970).
 - [22] L. Bianchi, *Memorie di Matematica e di Fisica della Società Italiana delle Scienze* **11**, 267 (1898). English translation: *Gen. Relativ. Gravit.* **33**, 2171 (2002), with an editorial note by R. Jantzen, *Gen. Relativ. Gravit.* **33**, 2157 (2001) and author's biography by R. Jantzen, *Gen. Relativ. Gravit.* **33**, 2168 (2001).
 - [23] A. H. Taub *Ann. Math.*, **53**, 472 (1951). Reprinted in *Gen. Relativ. Gravit.* **36**, 2699 (2004), with an editorial note by M. A. H. MacCallum, *Gen. Relativ. Gravit.* **36**, 2689 (2004) and author's biography by B. Mashhoon, *Gen. Relativ. Gravit.* **36**, 2695 (2004).
 - [24] K. Gödel, *Rev. Mod. Phys.* **21**, 447 (1949). Reprinted in *Gen. Relativ. Gravit.* **32**, 1409 and 1419 (2000), with an editorial note by G. F. R. Ellis, *Gen. Relativ. Gravit.* **32**, 1399 (2000), and author's biography by A. Krasiński, *Gen. Relativ. Gravit.* **32**, 1407 (2000).
 - [25] R. Jantzen, *Gen. Relativ. Gravit.* **33**, 2157 (2001).
 - [26] A. Krasiński, *Acta. Phys. Polon.* **B5**, 411 (1974), and **B6**, 223 (1975).
 - [27] A. Krasiński, *J. Math. Phys.* **39**, 380 (1998); **39**, 401 (1998); **39**, 2148 (1998).
 - [28] A. Krasiński, *J. Math. Phys.* **42**, 355 and 3628 (2001).
 - [29] R. S. Harness, *J. Phys.* **A15**, 135 (1982).
 - [30] C. B. Collins, *Gen. Relativ. Gravit.* **10**, 925 (1979).
 - [31] A. Krasiński, *Gen. Relativ. Gravit.* **13**, 1021 (1981).

- [32] T. Wolf, *Exakte Lösungen der Einsteinschen Feldgleichungen mit flachen Schnitten.* PhD Thesis, University of Jena 1985.
- [33] H. Stephani, D. Kramer, M. MacCallum, C. Hoenselaers and E. Herlt, *Exact Solutions of Einstein's Field Equations.* 2nd Edition. Cambridge University Press 2003.
- [34] D. M. Eardley, *Commun. Math. Phys.* **37**, 287 (1974).
- [35] C. B. Collins and J. Wainwright, *Phys. Rev.* **D27**, 1209 (1983).
- [36] C. B. Collins and G. F. R. Ellis, *Phys. Rep.* **56** no 2, 65 (1979).
- [37] Chap. 13 and 14 of Ref. [33], in particular Table 13.4 and p. 209.
- [38] A. A. Friedmann, *Z. Physik* **10**, 377 (1922); **21**, 326 (1924); English translation with historical comments: *Gen. Relativ. Gravit.* **31**, 1991 (1999); with an editorial note by G. F. R. Ellis and A. Krasiński, *Gen. Relativ. Gravit.* **31**, 1985 (1999), and author's biography by A. Krasiński, *Gen. Relativ. Gravit.* **31**, 1989 (1999). See also an addendum: *Gen. Relativ. Gravit.* **32**, 1937 (2000).
- [39] H. P. Robertson, *Proc. Nat. Acad. Sci. USA* **15**, 822 (1929).
- [40] H. P. Robertson, *Rev. Mod. Phys.* **5**, 62 (1933).
- [41] A. G. Walker, *Quart. J. Math. Oxford*, ser. 6, 81 (1935).
- [42] B. Datt, *Z. Physik* **108**, 314 (1938); English translation: *Gen. Relativ. Gravit.* **31**, 1619 (1999), with an editorial note by A. Krasiński, *Gen. Relativ. Gravit.* **31**, 1615 (1999). Author's biography could not be located.
- [43] A. S. Kompaneets and A. S. Chernov, *ZhETF* **47**, 1939 (1964); English translation: *Sov. Phys. JETP* **20**, 1303 (1965).
- [44] R. Kantowski, *PhD Thesis*, reprinted in *Gen. Relativ. Gravit.* **30**, 1665 (1998) with an editorial note by A. Krasiński, *Gen. Relativ. Gravit.* **30**, 1663 (1998) and author's biography by R. Kantowski, *Gen. Relativ. Gravit.* **30**, 1663 (1998).
- [45] V. A. Ruban, *Pisma v Red. ZhETF* **8**, 669 (1968); English translation: *Sov. Phys. JETP Lett.* **8**, 414 (1968); reprinted in English in *Gen. Relativ. Gravit.* **33**, 369 (2001).
- [46] V. A. Ruban, *ZhETF* **56**, 1914 (1969); English translation: *Sov. Phys. JETP* **29**, 1027 (1969); reprinted in English in *Gen. Relativ. Gravit.* **33**, 375 (2001), with an editorial note by A. Krasiński, *Gen. Relativ. Gravit.* **33**, 363 (2001), and author's biography by I. Dymnikova, *Gen. Relativ. Gravit.* **33**, 366 (2001).
- [47] L. P. Grishchuk, *Astron. Zh.* **44**, 1097 (1967); English translation: *Sov. Astron. A. J.* **11**, 881 (1968).
- [48] A. Einstein, *Ann. Physik* **49**, 769 (1916); English translation: pp. 109-164 in [6].

- [49] A. Z. Petrov, *Uchenye Zapiski Kazanskogo Gosudarstvennogo Universiteta im. V. I. Ulyanovicha-Lenina* **114**(8), 55 (1954); reprinted in English in *Gen. Relativ. Gravit.* **32**, no 8, 1665 (2000), with an editorial note by M. A. H. MacCallum, *Gen. Relativ. Gravit.* **32**, 1661 (2000) and author's biography by A. Gusev, *Gen. Relativ. Gravit.* **32**, 1663 (2000).
- [50] K. Lake, *General Relativity Database*. (An interactive program to identify manifolds with given properties.) Available at www.grdb.org.
- [51] M. A. H. Mac Callum, in *General Relativity, an Einstein Centenary Survey*, Edited by S. W. Hawking and W. Israel, Cambridge University Press 1979, p. 552–553.
- [52] C. W. Misner, K. S. Thorne and J. A. Wheeler, *Gravitation*. Freeman, San Francisco 1973.
- [53] Page 410 – 411 in Ref. [52].
- [54] E. P. Hubble, *Proc. Nat. Acad. Sci. USA* **15**, 169 (1929).
- [55] E. P. Hubble, *Mon. Not. Roy. Astr. Soc.* **113**, 658 (1953).
- [56] G. F. R. Ellis and A. Krasiński, *Gen. Relativ. Gravit.* **31**, 1985 (1999).
- [57] E. A. Milne, *Quart. J. Math. Oxford* **5**, 64 (1934); W. H. McCrea and E. A. Milne, *Quart. J. Math. Oxford* **5**, 73 (1934); both papers reprinted in *Gen. Relativ. Gravit.* **32**, 1939 and 1949 (2000).
- [58] M. N. Celerier, *Astron. Astrophys.* **353**, 63 (2000).
- [59] H. Iguchi, T. Nakamura and K. Nakao, *Progr. Theor. Phys.* **108**, 809 (2002).
- [60] I. D. Novikov, *Vestn. Mosk. Univ.* no. 6, 66 (1962).
- [61] J. M. Foyster adn C. B. G. McIntosh; *Commun. Math. Phys.* **27**, 241 (1972).
- [62] H. Nariai, *Scientific Reports of the Tôhoku University* **34**, 160 (1950); **35**, 46 (1951); both papers reprinted in *Gen. Relativ. Gravit.* **31**, 951 (1999).
- [63] A. Krasiński and J. Plebański, *Rep. Math. Phys.* **17**, 217 (1980).
- [64] B. Bertotti, *Phys. Rev.* **116**, 1331 (1959).
- [65] I. Robinson, *Bull. Acad. Polon. Sci., Ser. Mat. Fis. Astr.* **7**, 351 (1959).
- [66] A. Krasiński, *Gen. Relativ. Gravit.* **31**, 945 (1999).
- [67] K. Schwarzschild, *Sitzungsber. Preuss. Akad. Wiss.* p. 189 (1916).
- [68] J. M. M. Senovilla, *Gen. Relativ. Gravit.* **39**, 685 (2007).

- [69] J. Droste, *Koninklijke Nederlandsche Akademie van Wetenschappen Proceedings* **19**, 197 (1917); reprinted in *Gen. Relativ. Gravit.* **34**, 1545 (2002), with author's biography by C. Beenakker, *Gen. Relativ. Gravit.* **34**, 1543 (2002), and an editorial note by T. Rothman [70],
- [70] T. Rothman, *Gen. Relativ. Gravit.* **34**, 1541 (2002).
- [71] H. Reissner, *Ann. Physik* **50**, 106 (1916).
- [72] G. Nordström, *Koninklijke Nederlandsche Akademie van Wetenschappen Proceedings* **20**, 1238 (1918).
- [73] W. de Sitter, *Mon. Not. Roy. Astr. Soc.* **77**, 155 (1916–17).
- [74] F. Kottler, *Ann. Physik* **56**, 410 (1918).
- [75] M. Cahen and L. Defrise, *Commun. Math. Phys.* **11**, 56 (1968).
- [76] W. Kinnersley, *J. Math. Phys.* **10**, 1195 (1969).
- [77] C. W. Allen, *Astrophysical quantities*. The Athlone Press, University of London 1973.
- [78] K. Lang, *Astrophysical formulae*. Springer, Berlin – Heidelberg – New York 1974.
- [79] F. W. Dyson, A. S. Eddington and C. Davidson, *Phil. Trans. Roy. Soc. London A* **220**, 291 (1920); cited after Ref. [4], p. 5.
- [80] Ref. [4], p. 5.
- [81] C. M. Will, *Am. J. Phys.* **56**, 413 (1988); cited after Ref. [83].
- [82] J. Soldner, *Berliner Astronomisches Jahrbuch* 1804, str. 161; cited after Ref. [83].
- [83] P. Schneider, J. Ehlers and E. E. Falco, *Gravitational lenses*. Springer, Berlin 1992.
- [84] E. B. Fomalont and R. Sramek, *Astrophys. J.* **199**, 749 (1975); *Phys. Rev. Lett.* **36**, 1475 (1976); *Comments Astrophys.* **7**, 19 (1977).
- [85] Planck collaboration, Planck 2013 results. XVI. Cosmological parameters. *Astron. Astrophys.* **571**, A16 (2014).
- [86] https://upload.wikimedia.org/wikipedia/commons/c/c8/Einstein_cross.jpg
- [87] <http://creativecommons.org/licenses/by-sa/3.0/>,
https://en.wikipedia.org/wiki/Wikipedia:Text_of_Creative_Commons_Attribution-ShareAlike_3.0_Unported_License
- [88] https://en.wikipedia.org/wiki/Gravitational_lens#/media/File:A_Horseshoe_Einstein_Ring_from_Hubble.JPG
- [89] M. Kruskal, *Phys. Rev.* **119**, 1743 (1960).

- [90] G. Szekeres, *Publicationes Mathematicae Debrecen* **7**, 285 (1960); reprinted in *Gen. Relativ. Gravit.* **34**, 2001 (2002).
- [91] G. Lemaître, *Ann. Soc. Sci. Bruxelles* **A53**, 51 (1933); reprinted in: *Gen. Relativ. Gravit.* **29**, no 5, 641 (1997), with an editorial note and author's biography by A. Krasiński, *Gen. Relativ. Gravit.* **29**, 637 and 639 (1997).
- [92] I. D. Novikov, *Soobshcheniya GAISh* **132**, 3 (1964); reprinted in English in: *Gen. Relativ. Gravit.* **33**, 2259 (2001), with an editorial note by A. Krasiński, *Gen. Relativ. Gravit.* **33**, 2255 (2001), and author's (auto)biography by I. D. Novikov, *Gen. Relativ. Gravit.* **33**, 2258 (2001).
- [93] A. K. Raychaudhuri, *Phys. Rev.* **89**, 417 (1953).
- [94] D. Finkelstein, *Phys. Rev.* **110**, 965 (1958).
- [95] Frolov, V. P. and Novikov, I. D. (1998). *Black Hole Physics: Basic Concepts & New Developments*. Kluwer, Amsterdam, 770 pp.
- [96] I. D. Novikov, *Astron. Zh.* **41**, 1075 (1964); English translation: *Sov. Astr. A. J.* **8**, 857 (1965).
- [97] Y. Neeman and G. Tauber, *Astrophys. J.* **150**, 755 (1967).
- [98] P. S. Laplace, *Exposition du système du monde*, 1795; cited after [83].
- [99] A. Krasiński, *Inhomogeneous cosmological models*. Cambridge University Press 1997.
- [100] K. Schwarzschild, *Sitzber. Preuss. Akad. Wiss.* p. 424 (1916).
- [101] J. Ehlers, *Abhandlungen der Mathematisch-Naturwissenschaftlichen Klasse der Akademie der Wissenschaften und Literatur Mainz*, No 11 (1961); English translation: *Gen. Relativ. Gravit.* **25**, 1225 (1993).
- [102] G. F. R. Ellis, in: *Proceedings of the International School of Physics “Enrico Fermi”, Course 47: General Relativity and Cosmology*. Edited by R. K. Sachs. Academic Press, New York and London, p. 104 (1971); reprinted in: *Gen. Relativ. Gravit.* **41**, 581 (2009), with an editorial note by W. Stoeger, *Gen. Relativ. Gravit.* **41**, 575 (2009) and author's (auto)biography by G. F. R. Ellis, *Gen. Relativ. Gravit.* **41**, 578 (2009).
- [103] A. Barnes, *Gen. Relativ. Gravit.* **4**, 105 (1973).
- [104] A. K. Raychaudhuri, *Phys. Rev.* **98**, 1123 (1955); **106**, 172 (1957). The first paper was reprinted in *Gen. Relativ. Gravit.* **32**, 749 (2000), with an editorial note by J. Earman and A. K. Raychaudhuri, *Gen. Relativ. Gravit.* **32**, 743 (2000) and author's (auto)biography by A. K. Raychaudhuri, *Gen. Relativ. Gravit.* **32**, 746 (2000).
- [105] H. Stephani *Commun. Math. Phys.* **4**, 137 (1967).
- [106] S. W. Hawking, G. F. R. Ellis, *The large-scale structure of spacetime*. Cambridge University Press 1973.

- [107] J. M. M. Senovilla, *Gen. Relativ. Gravit.* **30**, 701 (1998).
- [108] G. Lemaître, *Ann. Soc. Sci. Bruxelles A***47**, 19 (1927); English translation (somewhat updated): *Mon. Not. Roy. Astr. Soc.* **91**, 483 (1927). Faithful translation: *Gen. Relativ. Gravit.* **45**, 1635 (2013), with an editorial note by J.-P. Luminet, *Gen. Relativ. Gravit.* **45**, 1619 (2013).
- [109] G. F. R. Ellis, in: *Cargése Lectures in Physics*, vol. 6. Edited by E. Schatzman. Gordon and Breach, New York 1973, p. 1 (1973).
- [110] J. Kristian and R. K. Sachs, *Astrophys. J.* **143**, 379 (1966); reprinted in: *Gen. Relativ. Gravit.* **43**, 337 (2011), with an editorial note by G. F. R. Ellis, *Gen. Relativ. Gravit.* **43**, 331 (2011) and Kristian's biography by A. Krasiński, *Gen. Relativ. Gravit.* **43**, 335 (2011).
- [111] I. M. H. Etherington, On the definition of distance in general relativity. *Phil. Mag., ser. 7* **15**, 761 (1933), reprinted in *Gen. Relativ. Gravit.* **39**, 1055 (2007) with an editorial note by G. F.R. Ellis, *Gen. Relativ. Gravit.* **39**, 1047 (2007) and author's biography by A. Krasiński, *Gen. Relativ. Gravit.* **39**, 1053 (2007).
- [112] A. Krasiński and C. Hellaby, Structure formation in the Lemaitre – Tolman model. *Phys. Rev.* **D65**, 023501 (2002).
- [113] A. Krasiński and C. Hellaby, in: Topics in mathematical physics, general relativity and cosmology. Proceedings of 2002 International Conference in Honor of Jerzy Plebański. Edited by H. Garcia-Compean, B. Mielnik, M. Montesinos and M. Przanowski. World Scientific, Singapore 2006, p. 279.
- [114] E. P. Hubble, *The Realm of the Nebulae*. New Haven: Yale University Press, 1982, p. 207 (Republication; First published 1936).
- [115] Royal Astronomical Society Discussion, *Observatory* **53**, 39 (1930).
- [116] G. Lemaître, *Mon. Not. R. Astr. Soc.* **91**, 483 (1931).
- [117] M. Livio, Mystery of the missing text solved. *Nature* **479**, 171 (2011).
- [118] A. Sandage, *Astrophys. J.* **136**, 319 (1962).
- [119] R. Lazkoz, I. Leanizbarrutia and V. Salzano, *European Phys. J. C*, **78**, 11 (2018).
- [120] A. Loeb, *Astrophys. J.* **499**, L111 (1998).
- [121] W. Mattig, Über den Zusammenhang zwischen Rotverschiebung und scheinbarer Helligkeit [On the connection between redshift and apparent luminosity]. *Astron. Nachr.* **284**, 109 (1958).
- [122] E. A. Milne, *Kinematic Relativity*. Clarendon Press, Oxford 1948.
- [123] H. P. Robertson and T. W. Noonan, *Relativity and cosmology*. W. B. Saunders Company, Philadelphia – London – Toronto 1968, p. 374 – 378.

- [124] W. Rindler, *Essential relativity. Special, General and Cosmological*. Revised 2nd ed. Springer, Berlin 1980.
- [125] W. Rindler, *Mon. Not. Roy. Astr. Soc.* **116**, 662 (1956); reprinted in *Gen. Relativ. Gravit.* **34**, 133 (2002), with an editorial note by A. Krasiński, *Gen. Relativ. Gravit.* **34**, 131 (2002) and authors (auto)biography by W. Rindler, *Gen. Relativ. Gravit.* **34**, 132 (2002).
- [126] G. Gamow, The evolution of the Universe, *Nature* **162**, 680 (1948).
- [127] R. A. Alpher and R. C. Herman, Evolution of the Universe, *Nature* **162**, 774 (1948).
- [128] R. H. Dicke, P. J. E. Peebles, P. G. Roll and D. T. Wilkinson, Cosmic black-body radiation, *Astrophys. J.* **142**, 414 (1965).
- [129] A. A. Penzias and R. W. Wilson, A measurement of excess antenna temperature at 4080 Mc/s, *Astrophys. J.* **142**, 419 (1965).
- [130] R. V. Wagoner, W. A. Fowler and F. Hoyle, On the synthesis of elements at very high temperatures, *Astrophys. J.* **148**, 3 (1967).
- [131] W. A. Fowler, *Nuclear Astrophysics*. American Philosophical Society, Philadelphia 1967.
- [132] A. M. Boesgaard and G. Steigman, Big bang nucleosynthesis – theories and observations, *Ann. Rev. Astron. Astrophys.* **23**, 319 (1985).
- [133] T. Padmanabhan, *Structure Formation in the Universe*, Cambridge University Press 1993.
- [134] K. Lang, *Astrophysical Formulae. Volume I: Radiation, Gas Processes and High Energy Astrophysics; Volume II: Space, Time, Matter and Cosmology*. Springer, Berlin – Heidelberg – New York 1999.
- [135] W. Hu (2004). webpage: <http://background.uchicago.edu/~whu/physics/tourpage.html>
- [136] H. Flanders, *Differential forms with applications to physical sciences*. Academic Press, New York and London 1963.
- [137] A. Krasiński and G. Giono, The charged dust solution of Ruban – matching to Reissner–Nordström and shell crossings. *Gen. Relativ. Gravit.* **44**, 239 (2012).
- [138] M. A. Podurets, *Astron. Zh.* **41**, 28 (1964); English translation: *Sov. Astr. A. J.* **8**, 19 (1964).
- [139] C. W. Misner and D. H. Sharp, *Phys. Rev.* **B136**, 571 (1964).
- [140] C. Hellaby and K. Lake, *Astrophys. J.* **290**, 381 (1985) + erratum in *Astrophys. J.* **300**, 461 (1985).

- [141] R. C. Tolman, *Proc. Nat. Acad. Sci. USA* **20**, 169 (1934); reprinted in *Gen. Relativ. Gravit.* **29**, 935 (1997), with an editorial note and author's biography by A. Krasiński, *Gen. Relativ. Gravit.* **29**, 931 and 932 (1997).
- [142] H. Bondi, *Mon. Not. Roy. Astr. Soc.* **107**, 410 (1947); reprinted in *Gen. Relativ. Gravit.* **31**, 1783 (1999), with an editorial note by A. Krasiński, *Gen. Relativ. Gravit.* **31**, 1777 (1999) and author's (auto)biography by H. Bondi, *Gen. Relativ. Gravit.* **31**, 1780 (1999).
- [143] G. C. Omer, *Proc. Nat. Acad. Sci. USA* **53**, 1 (1965).
- [144] J. Silk, *Astron. Astrophys.* **59**, 53 (1977).
- [145] V. A. Ruban, in: *Tezisy dokladov 3-y Sovetskoy Gravitatsyonnoy Konferentsii [Theses of Lectures of the 3rd Soviet Conference on Gravitation]*. Izdatel'stvo Erevanskogo Universiteta (1972), Erevan, p. 348.
- [146] V. A. Ruban, *ZhETF* **85**, 801 (1983); English translation: *Sov. Phys. JETP* **58**, 463 (1983).
- [147] P. Szekeres, *Commun. Math. Phys.* **41**, 55 (1975).
- [148] S. A. Gregory and L. A. Thompson, The Coma/A1367 supercluster and its environs. *Astrophys. J.* **222**, 784 (1978).
- [149] N. R. Sen, *Z. Astrophysik* **9**, 215 (1934); reprinted in *Gen. Relativ. Gravit.* **29**, no 11, 1477 (1997), with an editorial note by A. Krasiński, *Gen. Relativ. Gravit.* **29**, 1473 (1997) and author's biography by A. K. Raychaudhuri, *Gen. Relativ. Gravit.* **29**, 1474 (1997).
- [150] K. Maeda, M. Sasaki and H. Sato, *Progr. Theor. Phys.* **69**, 89 (1983).
- [151] H. Sato and K. Maeda, *Progr. Theor. Phys.* **70**, 119 (1983).
- [152] K. Maeda and H. Sato, *Progr. Theor. Phys.* **70**, 772 (1983).
- [153] K. Maeda and H. Sato, *Progr. Theor. Phys.* **70**, 1276 (1983).
- [154] H. Sato, in: *General Relativity and Gravitation*. Edited by B. Bertotti, F. de Felice and A. Pascolini. D. Reidel, Dordrecht, p. 289 (1984).
- [155] W. B. Bonnor, *Z. Astrophysik* **39**, 143 (1956); reprinted in *Gen. Relativ. Gravit.* **30**, 1113 (1998), with an editorial note by A. Krasiński, *Gen. Relativ. Gravit.* **30**, 1111 (1998) and author's (auto)biography by W. B. Bonnor, *Gen. Relativ. Gravit.* **30**, 1112 (1998).
- [156] T. Padmanabhan, *Cosmology and Astrophysics Through Problems*, Cambridge U P, 1996.
- [157] A. Krasiński and C. Hellaby, *Phys. Rev.* **D69**, 023502 (2004).

- [158] C. Hellaby and A. Krasiński, Alternative methods of describing structure formation in the Lemaître – Tolman model. *Phys. Rev.* **D73**, 023518 (2006).
- [159] N. Mustapha and C. Hellaby, *Gen. Relativ. Gravit.* **33**, 455 (2001).
- [160] A. Krasiński and C. Hellaby, *Phys. Rev.* **D69**, 043502 (2004).
- [161] A. Einstein and E. G. Straus, *Rev. Mod. Phys.* **17**, 120 (1945); + erratum *Rev. Mod. Phys.* **18**, 148 (1946).
- [162] K. Lake and R. Pim, *Astrophys. J.* **298**, 439 (1985).
- [163] R. Gautreau, *Phys. Rev.* **D29**, 198 (1984).
- [164] P. Szekeres, *Phys. Rev.* **D12**, 2941 (1975).
- [165] A. Barnes, *J. Phys.* **A3**, 653 (1970).
- [166] P. S. Joshi, *Global Aspects in Gravitation and Cosmology*. Clarendon Press, Oxford 1993.
- [167] P. Szekeres, in: *Gravitational Radiation, Collapsed Objects Exact Solutions*. Edited by C. Edwards. Springer (Lecture notes in physics, vol. 124), New York, p. 477 (1980).
- [168] C. Hellaby and K. Lake, *Astrophys. J.* **282**, 1 (1984); erratum *Astrophys. J.* **294**, 702 (1985).
- [169] A. Krasiński, Blueshifts in the Lemaître – Tolman models. *Phys. Rev.* **D90**, 103525 (2014).
- [170] A. Krasiński, Cosmological blueshifting may explain the gamma ray bursts. *Phys. Rev.* **D93**, 043525 (2016).
- [171] D. M. Eardley and L. Smarr, *Phys. Rev.* **D19**, 2239 (1979).
- [172] C. Hellaby and K. Lake, *The singularity of Eardley, Smarr and Christodoulou*. Preprint 88/7, Institute of Theoretical Physics and Astrophysics, University of Cape Town 1988.
- [173] S. W. Goode and J. Wainwright, *Phys. Rev.* **D26**, 3315 (1982).
- [174] C.-M. Yoo, T. Kai, K-i. Nakao, Redshift drift in Lemaître – Tolman – Bondi void universes. *Phys. Rev.* **D83**, 043527 (2011).
- [175] A. Krasiński, Accelerating expansion or inhomogeneity? A comparison of the Λ CDM and Lemaître – Tolman models. *Phys. Rev.* **D89**, 023520 (2014); erratum: *Phys. Rev.* **D89**, 089901(E) (2014).
- [176] A. Krasiński, Accelerating expansion or inhomogeneity? Part 2: Mimicking acceleration with the energy function in the Lemaître – Tolman model. *Phys. Rev.* **D90**, 023524 (2014).

- [177] M.-N. Célérier, K. Bolejko and A. Krasiński, A (giant) void is not mandatory to explain away dark energy with a Lemaître – Tolman model. *Astron. Astrophys.* **518**, A21 (2010).
- [178] A. Krasiński and K. Bolejko, Redshift propagation equations in the $\beta' \neq 0$ Szekeres models. *Phys. Rev.* **D83**, 083503 (2011).
- [179] M. Korzyński and J. Kopiński, Optical drift effects in general relativity. *J. Cosm. Astropart. Phys.* **03**, 012 (2018).
- [180] M. Grasso, M. Korzyński and J. Serbenta, Geometric optics in general relativity using bilocal operators. *Phys. Rev.* **D99**, 064038 (2019).
- [181] <http://sci.esa.int/science-e/www/area/index.cfm?fareaid=26>
- [182] G. F. R. Ellis, C. Hellaby and D. R. Matravers, *Astrophys. J.* **364**, 400 (1990).
- [183] C. Hellaby, *Class. Quant. Grav.* **13**, 2537 (1996).
- [184] M. M. de Souza, Hidden symmetries of Szekeres quasi-spherical solutions, *Rev. Bras. Fis.* **15**, 379 (1985).
- [185] A. Krasiński, Existence of blueshifts in quasi-spherical Szekeres spacetimes. *Phys. Rev.* **D94**, 023515 (2016).
- [186] R. A. Sussman, I. D. Gaspar, Multiple non-spherical structures from the extrema of Szekeres scalars. *Phys. Rev.* **D92**, 083533 (2015).
- [187] R. P. Kerr and A. Schild, A new class of vacuum solutions of the Einstein field equations. In *Atti del Convegno sulla Relatività Generale: Problemi dell'Energia e Onde Gravitazionali*. G. Barbera Editore, Firenze 1965, pp. 1. Reprinted in *Gen. Relativ. Gravit.* **41**, 2485 (2009), with an editorial note by A. Krasiński, E. Verdaguer and R. P. Kerr, *Gen. Relativ. Gravit.* **41**, 2469 (2009) and authors' biographies by A. Krasiński, *Gen. Relativ. Gravit.* **41**, 2482 (2009) (Kerr); and L. Shepley, *Gen. Relativ. Gravit.* **8**, 955 (1977) (Schild).
- [188] A. Krasiński, G. F. R. Ellis, M. A. H. MacCallum (editors). Golden Oldies in general relativity. Hidden gems. Springer, Heidelberg 2013, 493 pp.
- [189] B. Carter, Black hole equilibrium states, part I: Analytic and geometric properties of the Kerr solutions. In: *Black holes – les astres occlus*. Edited by C. de Witt and B. S. de Witt. Gordon and Breach, New York, London, Paris 1973, p. 61. Reprinted in *Gen. Relativ. Gravit.* **41**, no 12, 2874 (2009), with an editorial note by N. Kamran and A. Krasiński, *Gen. Relativ. Gravit.* **41**, 2867 (2009) and author's (auto)biography by B. Carter, *Gen. Relativ. Gravit.* **41**, 2870 (2009).
- [190] R. P. Kerr, *Phys. Rev. Lett.* **11**, 237 (1963).
- [191] R. H. Boyer and R. W. Lindquist, *J. Math. Phys.* **8**, 265 (1967).

- [192] H. Thirring, *Phys. Zeitschr.* **19**, 33 (1918); **22**, 29 (1921); J. Lense and H. Thirring, *Phys. Zeitschr.* **19**, 156 (1918). Reprinted in B. Mashhoon, F.W. Hehl and D.S. Theiss, *Gen. Relativ. Gravit.* **16**, 711 (1984) and in Ref. [188].
- [193] L. Schiff, *Phys. Rev. Lett.* **4**, 215 (1960); *Proc. Nat. Acad. Sci. USA* **46**, 871 (1960).
- [194] C. W. F. Everitt et al., *Phys. Rev. Lett.* **106**, 221101 (2011).
- [195] C. W. F. Everitt, in Experimental Gravitation. Proceedings of the International School of Physics “Enrico Fermi”, course 56. Edited by B Bertotti, Academic Press, New York 1974, p. 331.
- [196] https://en.wikipedia.org/wiki/Gravity_Probe_B
- [197] B. Carter, *Phys. Rev.* **141**, 1242 (1966).
- [198] B. Carter, *Phys. Rev.* **174**, 1559 (1968).
- [199] G. V. Kraniotis, Precise relativistic orbits in Kerr and Kerr-(anti) de Sitter space-times. *Class. Quant. Grav.* **21**, 4743 (2004).
- [200] G. V. Kraniotis, Frame dragging and bending of Light in Kerr and Kerr-(anti) de Sitter spacetimes. *Class. Quant. Grav.* **22**, 4391 (2005).
- [201] G. V. Kraniotis, Periapsis and gravitomagnetic precessions of stellar orbits in Kerr and Kerr-de Sitter black hole spacetimes. *Class. Quant. Grav.* **24**, 1775 (2007).
- [202] G. V. Kraniotis, Precise analytic treatment of Kerr and Kerr-(anti) de Sitter black holes as gravitational lenses. *Class. Quant. Grav.* **28**, 085021 (2011).
- [203] G. V. Kraniotis, Gravitational lensing and frame dragging of light in the Kerr-Newman and the Kerr-Newman-(anti) de Sitter black hole spacetimes. *Gen. Relativ. Gravit.* **46**, 1818 (2014).
- [204] J. M. Bardeen, in: *Black holes – les astres occlus*. Edited by C. de Witt and B. S. de Witt. Gordon and Breach, New York, London, Paris 1973, p. 219.
- [205] R. Penrose, in *Riv. Nuovo Cimento, Numero Speciale* **I**, 252 (1969); reprinted in *Gen. Relativ. Gravit.* **34**, 1141 (2002), with an editorial note by A. Królak, *Gen. Relativ. Gravit.* **34**, 1135 (2002) and author’s biography by W. Israel, *Gen. Relativ. Gravit.* **34**, 1138 (2002).
- [206] J. M. Bardeen, *Astrophys. J.* **162**, 71 (1970).
- [207] W. Roos, *Gen. Relativ. Gravit.* **7**, 431 (1976).
- [208] A. Krasiński, *Ann. Phys.* **112**, 22 (1978).
- [209] S. Chandrasekhar, *Ellipsoidal figures of equilibrium*. Yale University Press, New Haven and London 1969, p. 46.

- [210] H. C. Ohanian and R. Ruffini, *Gravitation and spacetime*. W. W. Norton & Company, New York – London 1994.
- [211] J. Weber, *General relativity and gravitational waves*. Wiley Interscience, New York 1961.
- [212] R. Arnowitt, S. Deser and C. W. Misner, in *Gravitation: An introduction to current research*. Edited by L. Witten. Wiley Interscience, New York 1962.
- [213] F. J. Ernst, *Phys. Rev.* **167**, 1175 (1968).
- [214] F. J. Ernst, *Phys. Rev.* **168**, 1415 (1968).
- [215] A. Tomimatsu and H. Sato, *Phys. Rev. Lett.* **29**, 1344 (1972).
- [216] V. Belinskii and E. Verdaguer, *Gravitational solitons*. Cambridge University Press, Cambridge 2001.
- [217] *Experimental gravitation. Proceedings of the International School of Physics “Enrico Fermi”, Course 56*. Edited by B. Bertotti. Academic Press, New York and London 1974.
- [218] R. Penrose and W. Rindler, *Spinors and Space-Time*. Cambridge University Press 1984.
- [219] Ya. B. Zeldovich and I. D. Novikov, *Relativistic astrophysics: Vol. I: Stars and relativity*. University of Chicago Press, Chicago 1971.
- [220] Ya. B. Zeldovich and I. D. Novikov, *Relativistic astrophysics: Vol. II: The Universe and relativity*. University of Chicago Press, Chicago 1974.
- [221] S. Weinberg, *Gravitation and Cosmology*. Wiley, New York (1972).
- [222] A. Pais, *Subtle is the Lord... The science and the life of Albert Einstein*. Oxford University Press, Oxford 1982.
- [223] J. L. Synge, *Relativity: The special Theory*. 2nd ed. North-Holland, Amsterdam 1965.
- [224] W. Kopczyński and A. Trautman, *Spacetime and gravitation*. Państwowe Wydawnictwo Naukowe, Warszawa, and J. Wiley, Chichester – New York – Brisbane – Toronto – Singapore 1992.
- [225] J. D. Jackson, *Classical electrodynamics*. Second edition. J. Wiley & Sons, Inc. 1975.
- [226] N. Ashby, Relativistic effects in the Global Positioning System. In: *Gravitation and relativity at the turn of the millennium. Proceedings of the 15th International Conference on General Relativity and Gravitation in Pune, India, 1997*. Edited by N. Dadhich and J. V. Narlikar. Inter-University Centre for Astronomy and Astrophysics, Pune 1998, p. 231.
- [227] N. Ashby, Relativity in the palm of your hand. *Mercury* **25**, 23 (1996).

- [228] N. Ashby, Relativity in GNSS. Chapter 24 in *Springer handbook of spacetime*, Springer 2014, pp. 509 – 525.
 - [229] N. Ashby, GNSS and other applications of general relativity. In: *General Relativity: the most beautiful of theories*. Edited by C. Rovelli, de Gruyter, Studies in Mathematical Physics Vol. 28, 2015.
 - [230] <https://www.gps.gov/systems/gps/modernization/civilsignals/>
 - [231] P. Langevin, *C. R. Acad. Sci. Paris* **173**, 831 (1921).
 - [232] G. Sagnac, L'éther lumineux d'emontré par l'effet du vent relatif d'éther dans un interféromètre en rotation uniforme. *C. R. Acad. Sci. (Paris)*, **157**, 708 (1913).
 - [233] G. Sagnac, Sur la preuve de la réalité de l'éther lumineux par l'expérience de l'interférographe tournant. *C. R. Acad. Sci. (Paris)*, **157**, 1410 (1913). This paper and the previous one cited after Ref. [234].
 - [234] J. Frauendiener, Notes on the Sagnac effect in General Relativity. arXiv:1808.07914.
- *****

Papers not referred to in the text

Ordering is random.

- [235] J. R. Oppenheimer and H. Snyder, *Phys. Rev.* **56**, 455 (1939).
- [236] W. B. Bonnor, *Mon. Not. Roy. Astr. Soc.* **217**, 597 (1985).
- [237] R. Penrose, in *Relativity, groups and cosmology*. Edited by B. and C. deWitt. Gordon and Breach, New York – London 1964, p. 565; reprinted in *Gen. Relativ. Gravit.* **43**, 901 (2011), with an editorial note by H. Friedrich, *Gen. Relativ. Gravit.* **43**, 897 (2011).
- [238] W. R. Stoeger, G. F. R. Ellis and S. D. Nel, *Class. Q. Grav.* **9**, 509 (1992).
- [239] C. Hellaby, *J. Math. Phys.* **37**, 2892 (1996).
- [240] Y. Suto, K. Sato and H. Sato, *Progr. Theor. Phys.* **71**, 938 (1984); **72**, 1137 (1984).
- [241] C. Hellaby , *Class. Q. Grav.* **4**, 635 (1987).
- [242] C. Hellaby and A. Krasiński, *Phys. Rev. D***66**, 084011 (2002).
- [243] R. P. A. C. Newman, *Class. Q. Grav.* **3**, 527 (1986).
- [244] P. Yodzis, H. J. Seifert and H. Müller zum Hagen, *Commun. Math. Phys.* **34**, 135 (1973).
- [245] C. J. S. Clarke and N. O'Donnell, *Rendiconti del Seminario Matematico della Universita e Politecnico de Torino* **50**(1), 39 (1992).

- [246] B. Waugh and K. Lake, *Phys. Rev.* **D38**, 1315 (1988).
- [247] V. Gorini, G. Grillo and M. Pelizza, *Phys. Lett.* **A135**, 154 (1989).
- [248] G. Grillo, *Class. Q. Grav.* **8**, 739 (1991).
- [249] D. M. Eardley, *Phys. Rev. Lett.* **33**, 442 (1974).
- [250] C. C. Dyer, *Mon. Not. Roy. Astr. Soc.* **189**, 189 (1979).
- [251] B. Waugh and K. Lake, *Phys. Rev.* **D40**, 2137 (1989).
- [252] J. P. S. Lemos, *Phys. Lett.* **A158**, 279 (1991).
- [253] I. H. Dwivedi and P. S. Joshi, *Class. Q. Grav.* **9**, L69 (1992).
- [254] P. S. Joshi and I. H. Dwivedi, *Phys. Rev.* **D47**, 5357 (1993).
- [255] C. J. S. Clarke, *Class. Q. Grav.* **10**, 1375 (1993).
- [256] S. S. Deshingkar, P. S. Joshi and I. H. Dwivedi, *Phys. Rev.* **D59**, 044018 (1999).
- [257] M. N. Celerier and J. Schneider, *Phys. Lett.* **A249**, 37 (1998).
- [258] M. N. Celerier, in *Mathematics of Gravitation II. Proceedings of the conference held in Warsaw 2003*. Published in the web page: <http://www.impan.gov.pl/Gravitation/ConfProc/index.html>
- [259] I. D. Novikov, *Vestn. Mosk. Univ.* no. 5, 90 (1962).
- [260] B. D. Miller, *Astrophys. J.* **208**, 275 (1976).
- [261] A. Meszaros, *Acta Phys. Hung.* **60**, 75 (1986).
- [262] M. B. Ribeiro, *Astrophys. J.* **388**, 1 (1992).
- [263] M. B. Ribeiro, *Astrophys. J.* **395**, 29 (1992).
- [264] M. B. Ribeiro, *Astrophys. J.* **415**, 469 (1993).
- [265] G. Dautcourt, in: *9th International Conference on General Relativity and Gravitation*, Jena, p. 315 (1980).
- [266] G. Dautcourt, *J. Phys.* **A16**, 3507 (1983).
- [267] G. Dautcourt, *Astron. Nachr.* **304**, 153 (1983).
- [268] G. Dautcourt, *Astron. Nachr.* **306**, 1 (1985).
- [269] H. H. Partovi and B. Mashhoon, *Astrophys. J.* **276**, 4 (1984).
- [270] G. F. R. Ellis, *J. Math. Phys.* **8**, 1171 (1967).

- [271] K. A. Bronnikov and N. V. Pavlov, in: *Diskusyonnye voprosy teorii otnositelnosti i gravitatsii [Controversial Questions of the Theory of Relativity and Gravitation]*. Nauka, Moskva (1979), p. 59.
- [272] K. A. Bronnikov, *Gen. Relativ. Gravit.* **15**, 823 (1983).
- [273] P. A. Vickers, *Ann. Inst. Poincarè A* **18**, 137 (1973).
- [274] M. A. Markov and V. P. Frolov, *Teor. Mat. Fiz.* **3**, 3 (1970); English translation: *Theor. Math. Phys.* **3**, 301 (1970).
- [275] I. S. Shikin, *ZhETF* **67**, 433 (1974); English translation: *Sov. Phys. JETP* **40**, 215 (1975).
- [276] I. S. Shikin, *Commun. Math. Phys.* **26**, 24 (1972).
- [277] A. Ori, *Class. Q. Grav.* **7**, 985 (1990).
- [278] A. Ori, *Phys. Rev. D* **44**, 2278 (1991).
- [279] M. P. Korkina and V. G. Martinenko, *Ukr. Fiz. Zh.* **20**, 626 (1975).
- [280] W. B. Bonnor, A. H. Sulaiman and N. Tomimura, *Gen. Relativ. Gravit.* **8**, 549 (1977).
- [281] J. D. Barrow and J. A. Stein-Schabes, *Phys. Lett. A* **103**, 315 (1984).
- [282] W. B. Bonnor and N. Tomimura, *Mon. Not. Roy. Astr. Soc.* **175**, 85 (1976).
- [283] D. A. Szafron and C. B. Collins, *J. Math. Phys.* **20**, 2354 (1979).
- [284] A. Barnes and R. R. Rowlingson, *Class. Q. Grav.* **6**, 949 (1989).
- [285] C. B. Collins and D. A. Szafron, *J. Math. Phys.* **20**, 2347 (1979).
- [286] B. K. Berger, D. M. Eardley and D. W. Olson, *Phys. Rev. D* **16**, 3086 (1977).
- [287] A. Spero and D. A. Szafron, *J. Math. Phys.* **19**, 1536 (1978).
- [288] P. S. Letelier, *Phys. Rev. D* **22**, 807 (1980).
- [289] J. Wainwright, *J. Math. Phys.* **18**, 672 (1977).
- [290] J. D. Barrow and J. Silk, *Astrophys. J.* **250**, 432 (1981).
- [291] W. B. Bonnor, *Commun. Math. Phys.* **51**, 191 (1976).
- [292] W. B. Bonnor, *Nature* **263**, 301 (1976).
- [293] A. K. Raychaudhuri, *Theoretical Cosmology*. Clarendon Press, Oxford (1979).
- [294] D. A. Szafron and J. Wainwright, *J. Math. Phys.* **18**, 1668 (1977).

- [295] Yu. E. Senin, in: *Problemy teorii gravitatsii i elementarnykh chastits* [Problems of Gravitation Theory and Elementary Particle Theory], 13th issue. Edited by K. P. Stanyukovich. Energoizdat, Moskva, p. 107 (1982).
- [296] G. C. Debney, R. P. Kerr and A. Schild, *J. Math. Phys.* **10**, 1842 (1969).
- [297] R. Courant and D. Hilbert, *Methods of mathematical physics, vol. II: Partial differential equations*. Wiley Interscience, New York 1965.
- [298] K. Knopp, *Theory of Functions, Part II*. New York: Dover (1996).
- [299] B. Carter, *Commun. Math. Phys.* **10**, 280 (1968).
- [300] V. P. Frolov, *Teor. Mat. Fiz.* **21**, 213 (1974); English translation: *Theor. Math. Phys.* **21**, 1088 (1974).
- [301] R. Debever, N. Kamran and R. G. McLenaghan, *Phys. Lett.* **93A**, 399 (1983); also reported in *13th International Conference on General Relativity and Gravitation, Padova 1983 – contributed papers*. Edited by B. Bertotti, F. de Felice and A. Pascolini. CNR Roma 1983, p. 216.
- [302] R. Debever, N. Kamran and R. G. McLenaghan, *J. Math. Phys.* **25**, 1955 (1984).
- [303] E. T. Newman, E. Couch, K. Chinnapared, A. Exton, A. Prakash and R. Torrence, *J. Math. Phys.* **6**, 918 (1965).
- [304] P. K. Raszewski, *Geometria Riemanna i analiza tensorowa* [Riemann geometry and tensor analysis]. (Polish translation from Russian). Państwowe Wydawnictwo Naukowe, Warszawa 1958.
- [305] J. Plebański, *On conformally equivalent Riemannian spaces*. CINVESTAV, Mexico 1967. [Note: This is a xeroxed typescript.]
- [306] H. Stephani, *Commun. Math. Phys.* **5**, 337 (1967).
- [307] J. Ehlers and W. Kundt, in *Gravitation, an introduction to current research*. Edited by L. Witten. Wiley, New York 1962, pp. 49 – 101.
- [308] A. Barnes, in *Classical general relativity*. Edited by W. B. Bonnor, J. N. Islam and M. A. H. MacCallum. Cambridge University Press 1984, pp. 15 – 23.
- [309] J. Haantjes, *Koninklijke Nederlandse Akademie van Wetenschappen Proceedings* **40**, 700 (1937); **43**, 1288 (1940).
- [310] R. Penrose, *Ann. Phys.* **10**, 171 (1960).
- [311] J. Plebański, it Spinors, tetrads and forms. Part I: CINVESTAV, Mexico 1974, Part II: CINVESTAV, Mexico 1975. [Note: These are xerox copies of handwritten notes. This work has apparently never been published.]
- [312] R. Debever, *C. R. Acad. Sci Paris* **249**, 1324 and 1744 (1959).

- [313] R. Debever, *Cahiers Phys.* **18**, 303 (1964).
- [314] M. Ferraris, M. Francaviglia and C. Reina, *Gen. Relativ. Gravit.* **14**, 243 (1982).
- [315] A. Palatini, *Rend. Circ. Mat. Palermo* **43**, 203 (1919).
- [316] A. Einstein, *Sitzungsberichte Preuss. Akad. Wiss.* p. 414 (1925).
- [317] E. Kasner, *Amer. J. Math.* **43**, 217 (1921).
- [318] C. Brans and R. H. Dicke, *Phys. Rev.* **124**, 925 (1961).
- [319] P. G. Bergmann, *Int. J. Theor. Phys.* **1**, 25 (1968).
- [320] R. V. Wagoner, *Phys. Rev.* **D1**, 3209 (1970).
- [321] V. Canuto, P. J. Adams, S.-H. Hsieh and E. Tsiang, *Phys. Rev.* **D16**, 1643 (1977).
- [322] A. Trautman, *Bull. Acad. Polon. Sci., ser. Sci. Math. Astr. Phys.* **20**, 503 (1972); *Symposia Mathematica* **12** 139 (1973).
- [323] N. Rosen, *Gen. Relativ. Gravit.* **4**, 435 (1973).
- [324] J. Lense and H. Thirring, *Phys. Zeitschr.* **19**, 156 (1918). English translation with comments: B. Mashhoon, F. W. Hehl and D. Theiss, *Gen. Rel. Grav.* **16**, 711 (1984).
- [325] <http://einstein.stanford.edu/>.
- [326] T. Kaluza, *Sitzungsber. Preuss. Akad. Wiss. Berlin, Math. Phys. Kl.* p. 966 (1921).
- [327] O. Klein, *Z. Physik* **37**, 895 (1926).; *Nature* **118**, 516 (1926).
- [328] T. Appelquist and A. Chodos, *Phys. Rev. Lett.* **50**, 141 (1983).
- [329] J. Wainwright and P. E. A. Yaremovicz, *Gen. Relativ. Gravit.* **7**, 345 and 595 (1976).
- [330] J. Z. Li and C. B. Liang, *Chin. Phys. Lett.* **2**, 23 (1985).
- [331] J. C. Graves and D. R. Brill, *Phys. Rev.* **120**, 1507 (1960).
- [332] C. Fronsdal, *Phys. Rev.* **116**, 778 (1959).
- [333] A. Krasiński, *Gen. Relativ. Gravit.* **33**, 145 (2001).
- [334] B. Carter, *Phys. Lett.* **21**, 423 (1966).
- [335] J. Goldberg and R. K. Sachs, *Acta Phys. Polon* **22 (supplement)**, 13 (1962).
- [336] P. Coles and G. F. R. Ellis, *Is the Universe open or closed? The density of matter in the Universe.* Cambridge University Press 1997.
- [337] Peebles, P. J. E. (1993). *Principles of Physical Cosmology.* Princeton University Press.

- [338] T. Rothman and G. F. R. Ellis, *Astronomy* **15** no 2, 6 (1987); see also the University of Cape Town preprint 85/18.
- [339] G. Lemaître, *C. R. Acad. Sci. Paris* **196**, 1085 (1933).
- [340] J. V. Arnau, M. Fullana, L. Monreal and D. Saez, *Astrophys. J.* **402**, 359 (1993).
- [341] D. Saez, J. V. Arnau and M. J. Fullana, *Mon. Not. Roy. Astr. Soc.* **263**, 681 (1993).
- [342] J. V. Arnau, M. Fullana and D. Saez, *Mon. Not. Roy. Astr. Soc.* **268**, L17 (1994).
- [343] D. J. Raine and E. G. Thomas, *Mon. Not. Roy. Astr. Soc.* **195**, 649 (1981).
- [344] http://map.gsfc.nasa.gov/m_uni/uni_101Flucts.html
- [345] J. C. Mather, C. L. Bennett, N. W. Boggess, M. G. Hauser, G. F. Smoot and E. L. Wright, in: *General Relativity and Gravitation 1992. Proceedings of the 13th International Conference on General Relativity and Gravitation at Cordoba 1992*. Edited by R. J. Gleiser, C. N. Kozameh and O. M. Moreschi. Institute of Physics Publishing, Boston and Philadelphia (1993), p. 151.
- [346] D. Christodoulou, *Commun. Math. Phys.* **93**, 171 (1984).
- [347] J. Werle, *Termodynamika fenomenologiczna*. Państwowe Wydawnictwo Naukowe, Warszawa 1957, pp. 78 – 80 (in Polish).
- [348] C. Bona and B. Coll, *C. R. Acad. Sci. Paris* **1301**, 613 (1985).
- [349] C. Bona and B. Coll, *Gen. Relativ. Gravit.* **20**, 297 (1988).
- [350] B. Coll and J. J. Ferrando, *J. Math. Phys.* **30**, 2918 (1989).
- [351] H. Quevedo and R. Susman, *Class. Q. Grav.* **12**, 859 (1995); *J. Math. Phys.* **36**, 1365 (1995).
- [352] A. Krasiński, H. Quevedo and R. Susman, *J. Math. Phys.* **38**, 2602 (1997); more detailed version available as a preprint.
- [353] D. A. Szafron, *J. Math. Phys.* **18**, 1673 (1977).
- [354] A. G. Webster, *The dynamics of particles and of rigid, elastic and fluid bodies*. Hafner, New York 1949, p. 413.
- [355] A. Krasiński, *Phys. Lett.* **A80**, 238 (1980).
- [356] O. D. Kellogg, *Foundations of potential theory*. Frederick Ungar, New York 1929, pp. 184 – 191.
- [357] S. Bażański, R. Kaczyńska and A. Krasiński, *Phys. Lett.* **A115**, 33 (1985).