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Bibliography

- Abbott, D. C., Biegging, J. H. & Churchwell, E. 1981, ApJ, 250, 645
- Abell et al., 2009, LSST Science Collaborations, arXiv, arXiv:0912.0201L
- Alpher, R. A., Bethe, H. & Gamow, G., 1948, Phys.Rev., 73, 803
- Baars, J.W.M., Genzel, R., Pauliny-Toth, I.I.K. & Witzel, A. 1977, A&A, 61, 99
- Barlow, R.J., 1989, *Statistics*, John Wiley & Sons Ltd., England
- Bevington, P.R. & Robinson, D.K., 2003, *Data Reduction and Error Analysis for the Physical Sciences*, 3rd Ed., McGraw-Hill, New York, USA
- Blandford, R. D. 2005, in BAAS, 37, 1220
- Boncz, P., May 2002, Ph.D. Thesis, *Monet: A Next-Generation DBMS Kernel For Query-Intensive Applications*, Universiteit van Amsterdam, The Netherlands
- Boncz, P.A., Kersten, M.L. & Manegold, S., 2008, Communications of the ACM, Vol. 51, Nr. 12, p. 77
- Brentjens, M. A. 2008, A&A, 489, 69
- Briggs, D.S., Schwab, F.R. & Sramek, R.A., 1999, Ch. 7 in *Synthesis Imaging in Radio Astronomy II*, ed. G.B. Taylor, C.L. Carilli & R. A. Perley (San Francisco, CA: ASP), 180, 127
- Brown, S. & Rudnick, L. 2009, AJ, 137, 3158
- Burke, B.F. & Graham-Smith, F., 2002, *An Introduction to Radio Astronomy*, 2nd Edition, Cambridge University Press, Cambridge, UK
- Cameron, P. B., Chandra, P., Ray, A., et al., 2005, Nature, 434, 1112
- Chandra, P. 2005a, GRB Coordinates Network, 2947, 1
- Chandra, P. 2005b, GRB Coordinates Network, 2995, 1

- Chatterjee, S., Goss, W.M. & Brisken, W.F. 2005, ApJ, 634, L101
- Christiansen, W.N. & Hindman, J.V., 1952, Aust. J. of Sci. Res., 5, 437
- Cohen, A.S., Lane, W.M., Cotton, W.D., Kassim, N.E., Lazio, T.J.W., Perley, R.A., Condon, J.J., Erickson, W.C., 2007, AJ, 134, 1245
- Condon, J. J., Cotton, W. D., Greisen, E. W., Yin, Q. F., Perley, R. A., Taylor, G. B., Broderick, J. J., 1998, AJ, 115, 1693
- Copeland, G.P. & Khoshafian, S.N., 1985, in *Proceedings of the 1985 ACM SIGMOD International Conference on Management of Data*, ACM, New York, USA
- Cordes, J.M. & Lazio, T.J.W. 2003, astro-ph/0301598, http://rsd-www.nrl.navy.mil/7213/lazio/ne_model/
- Dai, Z. G., Wu, X. F., Wang, X. Y., Huang, Y. F. & Zhang, B. 2005, ApJ, 629, L81
- Dicke, R.H., Peebles, P.J.E., Roll, P.G., Wilkinson, D.T., 1965, ApJ, 142, 414
- Duncan, R. A. & White, S. M. 2002, MNRAS, 330, 63
- Ewen, H.I. & Purcell, E.M., 1951, Nature, 168, 356
- Fender, R.P., Belloni, T.M. & Gallo, E., 2004, MNRAS, 355, 1105
- Fender, R.P. et al., in *Proceedings of the VI Microquasar Workshop: Microquasars and Beyond*, 2006, 104
- Fender, R. P., Muxlow, T. W. B., Garrett, M. A., et al. 2006, MNRAS, 367, L6
- Fender R., Wijers R., Stappers B. & the LOFAR Transients Key Science Project, in *Bursts, Pulses and Flickering: wide-field monitoring of the dynamic radio sky*, Tzioumis, Lazio & Fender (Eds), Proceedings of Science, 2007, p. 30
- Gaensler, B. M., Kouveliotou, C., Gelfand, J. D., et al. 2005a, Nature, 434, 1104
- Gaensler, B. M., Kouveliotou, C., Wijers, R., et al. 2005b, GRB Coordinates Network, 2931, 1
- Gamow, G., 1946, Phys.Rev., 70, 572
- Gelfand, J. D., Lyubarsky, Y. E., Eichler, D., et al. 2005, ApJ, 634, L89

- Gray J., Nieto-Santisteban M.A., Szalay A. 2006, The Zones Algorithm for Finding Points-Near-a-Point or Cross-Matching Spatial Datasets, Microsoft, Johns Hopkins University, MSR TR 2006 52
- Greisen, E.W. 2003, in *Information Handling in Astronomy - Historical Vistas*, ed. A. Heck (Astrophysics and Space Science Library, Kluwer Academic Publishers, Dordrecht, Netherlands), 285, 109.
- Gri  meier, J.-M., Zarka, P. & Spreeuw, H., 2007, A&A, 475, 359
- Haakonsen, C.B. & Rutledge, R.E., 2009, ApJS, 184, 138
- Hagen, J.P. & McClain, E.F., 1954, ApJ, 120, 368
- Harris, D.E., Cheung, C.C., Biretta, J.A., Sparks, W.B., Junor, W., Perlman, E.S. & Wilson, A.S. 2006, ApJ, 640, 211
- Helmboldt J.F., Kassim, N.E., Cohen, A.S., Lane, W.M., Lazio, T.J., 2008, ApJS, 174, 313
- Hewish, A., Bell, S.J., Pilkington, J.D.H., Scott, P.F., Collins, R.A., 1968, Nature, 217, 709
- Hodapp, K.W., et al., 2004, AN, 325, 636
- Hogg, D.W., 2001, AJ, 121, 1207
- van der Horst, A.J., Kamble, A., Resmi, L., Wijers, R.A.M.J., Bhattacharya, D., Scheers, B., Rol, E., Strom, R., Kouveliotou, C., Oosterloo, T., Ishwara-Chandra, C.H., 2008, A&A, 480, 35
- van de Hulst, H.C., 1945, Ned. Tijdschr. Natuurk., 11, 201
- Hurley, K., Boggs, S. E., Smith, D. M., et al. 2005, Nature, 434, 1098
- Huynh M.T., Jackson C.A., Norris R.P., Prandoni I., 2005, AJ, 130, 1373
- Hyman, S.D., Lazio, T.J.W., Kassim, N.E., Ray, P.S., Markwardt, C.B. & Yusef-Zadeh, F., 2005, Nature, 434, 50
- Hyman, S.D., Lazio, T.J.W., Roy, S., Ray, P.S., Kassim, N.E. & Neureuther, J.L., 2006, ApJ, 639, 348
- Hyman, S.D., Roy, S., Pal, S., Lazio, T.J.W., Ray, P.S., Kassim, N.E. & Bhatnagar, S., 2007, ApJ, 660, L121
- Idreos, S., Kersten M. L., Manegold, S., 2007, CIDR 2007, January 7-10, Asilomar, CA, USA, p. 68
- Israel, G. L., Belloni, T., Stella, L., et al. 2005, ApJ, 628, L53

- Ivanova M., Nes N., Goncalves R., Kersten M., in: *Proceedings of the 19th International Conference on Scientific and Statistical Database Management (SSDBM)*, 1st Ed., 2007, Banff. IEEE Computer Society, 19, 13
- Jansky, K.G., 1933, *Nature*, 132, 66J
- Kamble A., et al., 2010, in preparation
- Kaplan, D.L., Hyman, S.D., Roy, S., Bandyopadhyay, R.M., Chakrabarty, D., Kassim, N.E., Lazio, T.J.W. & Ray, P.S. 2008, *ApJ*, 687, 262
- Kettenis, M., van Langevelde, H. J., Reynolds, C. & Cotton, B. 2006, in *Astronomical Data Analysis Software and Systems XV*, ed. C. Gabriel, C. Arviset, D. Ponz & S. Enrique, ASP Conf. Ser., 351, 497
- Khoshafian, S., Copeland, G.P., Jagodis T., Boral, H. & Valduriez, P., 1987, in *Proceedings of the Third International Conference on Data Engineering*, IEEE Computer Society, Washington DC, USA
- Kimball, A.E. & Ivezić, Ž., 2008, *AJ*, 136, 684
- Kraus, J.D., 1986, *Radio Astronomy*, 2nd Edition, Cygnus-Quasar Books, Durham, N.H., USA; University of New Hampshire Printing Services, Nov. 2005
- Kulkarni, S.R. & Phinney, E.S. 2005, *Nature*, 434, 28
- LaRosa, T.N., Kassim, N.E., Lazio, T.J.W. & Hyman, S.D. 2000, *AJ*, 119, 207
- Law C. & Hessels, J. 2009, *Conclusions on Standard Bands for RSM*, Internal document
- van Leeuwen, J. & Stappers, B. 2010, *A&A*, 509, A7
- Lonsdale, C.J., et al., 2009, arXiv, arXiv:0903.1828
- Mészáros, P., 2006, *RPPh*, 69, 2259
- Miley, G., 2010, published in "ISKAF2010 Science Meeting", *Proceedings of Science (ISKAF2010)*, 40
- Miller-Jones J., 2006, *On frequency bands for the Transient database*, Internal document
- Miller-Jones J., 2008, *On the number of sources expected to be detected by the LOFAR Transients Key Project: update following descope*, Internal document
- Mitra, D. & Ramachandran, R. 2001, *A&A*, 370, 586

- Muller, C.A. & Oort, J.H., 1951, *Nature*, 168, 357
- Nakar, E., Piran, T. & Sari, R. 2005, *ApJ*, 635, 516
- Navarro, J., de Bruyn, A.G., Frail, D.A., Kulkarni, S.R. & Lyne, A.G., 1995, *ApJ*, 455, L55
- Nijboer, R.J. & Pandey-Pommier, M. 2009, *LOFAR imaging capabilities and system sensitivity*, LOFAR-ASTRON-MEM-251, 24 Jun 2009
- Nord, M.E., Lazio, T.J.W., Kassim, N.E., Hyman, S.D., LaRosa, T.N., Brogan, C.L. & Duric, N. 2004, *AJ*, 128, 1646
- Palmer, D. M., Barthelmy, S., Gehrels, N., et al. 2005, *Nature*, 434, 1107
- Panagia, N. & Felli, M. 1975, *A&A*, 39, 1
- van Paradijs, J., Kouveliotou, C. & Wijers, R.A.M.J., 2000, *ARA&A*, 38, 379V
- Penzias, A.A. & Wilson, R.W., 1965, *ApJ*, 142, 419
- Pierre, M., Chiappetti, L., Pacaud, F., Gueguen, A., Libbrecht, C., Altieri, B., Aussel, H., Gandhi, P., Garcet, O., Gosset, E et al., 2007, *MNRAS*, 382, 279
- Portegies Zwart, S.F. & Spreeuw, H.N. 1996, *A&A*, 312, 670
- Rea, N., Israel, G., Covino, S., et al. 2005, *The Astronomer's Telegram*, 645, 1
- Reber, G., 1940, *ApJ*, 91, 621
- Reber, G., 1944, *ApJ*, 100, 279
- Reid, M.J. 1993, *ARA&A*, 31, 345.
- Rengelink, R. B., Tang, Y., de Bruyn, A. G., Miley, G. K., Bremer, M. N., Roettgering, H. J. A., Bremer, M. A. R. 1997, *A&AS*, 124, 259
- Richter, G. A. 1975, *AN*, 296, 65
- Roy, S., Hyman, S.D., Pal, S., Lazio, T.J.W., Ray, P.S., Kassim, N.E. & Bhatnagar, S. in *Proceedings of 'Bursts, Pulses and Flickering: wide-field monitoring of the dynamic radio sky'*, 12-15 June 2007, Kerastari, Tripolis, Greece., p. 9
- Roy, S., Hyman, S.D., Pal, S., Lazio, T.J.W., Ray, P.S., Kassim, N.E. & Bhatnagar, S. in *Proc. 25th meeting of ASI (2007)*, 2008, p. 25
- de Ruiter, H. R., Willis, A.G. & Arp, H.C. 1977, *A&AS*, 28, 211

- Rutledge, R. E., Brunner, R. J., Prince, T. A., Lonsdale, C. 2000, *ApJS*, 131, 335
- Rybicki, G.B. & Lightman, A.P. in *Radiative Processes in Astrophysics*, Wiley, New York, NY, 1979, p 8, p 25-26.
- Ryle, M. & Hewish, A., 1960, *MNRAS*, 120, 220
- R. Seaman et al., *Sky Event Reporting Metadata (VOEvent)*, version 1.11, International Virtual Observatory Alliance, 2006, <http://www.ivoa.net/-Documents/PR/VOE/VOEvent-20060810.html>
- Schwartz, S. J., Zane, S., Wilson, R. J., et al. 2005, *ApJ*, 627, L129
- Skinner, C.J., White, R.L., Becker, R.H., et al., 1996, in *Radio Emission from the Stars and the Sun*, eds. A.R. Taylor & J.M. Paredes, ASP Conf. Ser., 93, 23
- Spreeuw, H., Scheers, B. & Wijers, R.A.M.J., 2010, *A&A*, 509, 99
- Spreeuw, J. N., June 2010, Ph.D. Thesis, *Search and detection of low frequency radio transients*, Ch. 2 & 3, <http://dare.uva.nl/record/340633>, University of Amsterdam, The Netherlands
- Stoughton, C., et al., 2002, *AJ*, 123, 485S
- Sutherland, W. & Saunders, W. 1992, *MNRAS*, 259, 413
- Swinbank, J., Coenen, T., Law, C., Masters, J., Miller-Jones, J., Scheers, B., Spreeuw, H., Stappers, B., Wijers, R. & Wise, M., 2007, *Proceedings of Bursts, Pulses and Flickering: wide-field monitoring of the dynamic radio sky*, June 12–15 2007, Kerastari, Tripolis, Greece, *Proceedings of Science (Dynamic2007)*, p. 40
- Swinbank J., 2009, *Proceedings of the 8th International e-VLBI Workshop*, 22-26 June 2009, Madrid, Spain. Published online at <http://pos.sissa.it/-cgi-bin/reader/conf.cgi?confid=82>, p. 22
- Swinbank J., 2010, *Proceedings of the ISKAF2010 Science Meeting*, June 10–14 2010, Assen, the Netherlands, *Proceedings of Science (ISKAF2010)*, p. 82
- Szalay, A.S. & Blakeley, J.A., 2009, *The Fourth Paradigm. Data-Intensive Scientific Discovery*, Eds. Hey, T., Tansley, S. & Tolle, K., Microsoft Corporation, USAi, p. 5
- Tanvir, N.R., Chapman, R., Levan, A.J. & Priddey, R.S. 2005, *Nature*, 438, 991

- Taylor, G.B., Gelfand, J.D., Gaensler, B.M., Granot, J., Kouveliotou, C., Fender, R.P., Ramirez-Ruiz, E., Eichler, D., Lyubarsky, Y.E., Garrett, M., Wijers, R.A.M.J., 2005, ApJ, 634, 93
- Taylor, G. B., Momjian, E., Pihlstrøm, Y., Ghosh, T., Salter, C. 2005 ApJ, 622, 86
- Thakar, A.R., 2008, Computing in Science and Engineering, Volume 10, Issue 6, 65-71
- Thompson, A.R., Moran, J.M. & Swenson Jr., G.W., 2004, *Interferometry and Synthesis in Radio Astronomy*, 2nd Ed., Wiley-VCH, Weinheim, Germany
- Turolla, R., Possenti, A., & Treves, A. 2005, ApJ, 628, L49
- Verschuur, G.L., 2007, *The invisible universe*, 2nd Ed., Springer
- de Vos, M., Gunst, A.W. & Nijboer, R. 2009, Proceedings of the IEEE, Vol. 97, No. 8, p. 1431
- Wang, X.Y., Wu, X.F., Fan, Y.Z., Dai, Z.G. & Zhang, B. 2005, ApJ, 623, L29
- Welch, J., et al., 2009, arXiv, arXiv:0904.0762
- Wijnholds, S.J., 2010, Ph.D. Thesis, *Fish-Eye Observing with Phased Array Radio Telescopes*, TU Delft, The Netherlands
- Wright, A. E. & Barlow, M. J. 1975, MNRAS, 170, 41
- Wrobel, J.M. & Walker, R.C., 1999, Ch. 9 in *Synthesis Imaging in Radio Astronomy II*, ed. G.B. Taylor, C.L. Carilli & R. A. Perley (San Francisco, CA: ASP), 180, 171
- Zhang, B. & Gil, J., 2005, ApJ, 631, L143
- Zhu, W.W. & Xu, R.X. 2006, MNRAS, 365, L16