



Universiteit
Leiden
The Netherlands

From intracluster medium dynamics to particle acceleration

Zhang, X.

Citation

Zhang, X. (2022, June 29). *From intracluster medium dynamics to particle acceleration*. Retrieved from <https://hdl.handle.net/1887/3421512>

Version: Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/3421512>

Note: To cite this publication please use the final published version (if applicable).

Bibliography

- Abell, G. O. 1958, *ApJS*, 3, 211
- Ackermann, M., Ajello, M., Albert, A., et al. 2016, *ApJ*, 819, 149
- Adam, R., Goksu, H., Brown, S., Rudnick, L., & Ferrari, C. 2021, *A&A*, 648, A60
- Akamatsu, H., Hoshino, A., Ishisaki, Y., et al. 2011, *PASJ*, 63, S1019
- Akamatsu, H. & Kawahara, H. 2013, *PASJ*, 65, 16
- Akamatsu, H., Mizuno, M., Ota, N., et al. 2017, *A&A*, 600, A100
- Akamatsu, H., van Weeren, R. J., Ogreaan, G. A., et al. 2015, *A&A*, 582, A87
- Akritas, M. G. & Bershad, M. A. 1996, *ApJ*, 470, 706
- Allen, S. W., Evrard, A. E., & Mantz, A. B. 2011, *ARA&A*, 49, 409
- Ambikasaran, S., Foreman-Mackey, D., Greengard, L., Hogg, D. W., & O’Neil, M. 2015, *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 38, 252
- Andrade-Santos, F., Jones, C., Forman, W. R., et al. 2017, *ApJ*, 843, 76
- Andrade-Santos, F., van Weeren, R. J., Di Gennaro, G., et al. 2019, *ApJ*, 887, 31
- Arévalo, P., Churazov, E., Zhuravleva, I., Hernández-Monteagudo, C., & Revnivtsev, M. 2012, *MNRAS*, 426, 1793
- Arnaud, M., Pointecouteau, E., & Pratt, G. W. 2007, *A&A*, 474, L37
- Ascasibar, Y. & Markevitch, M. 2006, *ApJ*, 650, 102
- Astropy Collaboration, Price-Whelan, A. M., Sipőcz, B. M., et al. 2018, *AJ*, 156, 123
- Astropy Collaboration, Robitaille, T. P., Tollerud, E. J., et al. 2013, *A&A*, 558, A33
- Bagchi, J., Durret, F., Neto, G. B. L., & Paul, S. 2006, *Science*, 314, 791
- Bagchi, J., Enßlin, T. A., Miniati, F., et al. 2002, *New A*, 7, 249
- Baghmany, V., Zargaryan, D., Aharonian, F., et al. 2021, arXiv e-prints, arXiv:2110.00309
- Bell, A. R. 1978a, *MNRAS*, 182, 147
- Bell, A. R. 1978b, *MNRAS*, 182, 443
- Benson, B., Wittman, D. M., Golovich, N., et al. 2017, *ApJ*, 841, 7
- Biviano, A. 2000, in *Constructing the Universe with Clusters of Galaxies*, ed. F. Durret & D. Gerbal, 1

- Blandford, R. & Eichler, D. 1987, *Phys. Rep.*, 154, 1
- Blandford, R. D. & Ostriker, J. P. 1978, *ApJ*, 221, L29
- Bonafede, A., Brüggén, M., Rafferty, D., et al. 2018, *MNRAS*, 478, 2927
- Bonafede, A., Brunetti, G., Rudnick, L., et al. 2022, arXiv e-prints, arXiv:2203.01958
- Bonafede, A., Cassano, R., Brüggén, M., et al. 2017, *MNRAS*, 470, 3465
- Bonafede, A., Giovannini, G., Feretti, L., Govoni, F., & Murgia, M. 2009, *A&A*, 494, 429
- Bonafede, A., Intema, H. T., Brüggén, M., et al. 2014, *ApJ*, 785, 1
- Boschin, W., Girardi, M., & Barrena, R. 2013, *MNRAS*, 434, 772
- Botteon, A., Brunetti, G., van Weeren, R. J., et al. 2020, *ApJ*, 897, 93
- Botteon, A., Gastaldello, F., & Brunetti, G. 2018, *MNRAS*, 476, 5591
- Botteon, A., Gastaldello, F., Brunetti, G., & Kale, R. 2016, *MNRAS*, 463, 1534
- Botteon, A., Shimwell, T. W., Cassano, R., et al. 2022, *A&A*, 660, A78
- Bourdin, H., Mazzotta, P., Markevitch, M., Giacintucci, S., & Brunetti, G. 2013, *ApJ*, 764, 82
- Brown, S., Duisterhoeft, J., & Rudnick, L. 2011, *ApJ*, 727, L25
- Brown, S. & Rudnick, L. 2011, *MNRAS*, 412, 2
- Brunetti, G., Cassano, R., Dolag, K., & Setti, G. 2009, *A&A*, 507, 661
- Brunetti, G. & Jones, T. W. 2014, *International Journal of Modern Physics D*, 23, 1430007
- Brunetti, G. & Lazarian, A. 2007, *MNRAS*, 378, 245
- Brunetti, G. & Lazarian, A. 2011, *MNRAS*, 410, 127
- Brzycki, B. & ZuHone, J. 2019, *ApJ*, 883, 118
- Bulbul, E., Gaspari, M., Alvarez, G., et al. 2019, *BAAS*, 51, 210
- Burns, J. O., Skillman, S. W., & O'Shea, B. W. 2010, *ApJ*, 721, 1105
- Cash, W. 1979, *ApJ*, 228, 939
- Cassano, R., Brunetti, G., & Setti, G. 2006, *MNRAS*, 369, 1577
- Cassano, R., Brunetti, G., Setti, G., Govoni, F., & Dolag, K. 2007, *MNRAS*, 378, 1565
- Cassano, R., Etori, S., Brunetti, G., et al. 2013, *ApJ*, 777, 141
- Cassano, R., Etori, S., Giacintucci, S., et al. 2010, *ApJ*, 721, L82
- Cassano, R., Gitti, M., & Brunetti, G. 2008, *A&A*, 486, L31
- Cavaliere, A. & Fusco-Femiano, R. 1976, *A&A*, 500, 95
- Cavaliere, A. & Fusco-Femiano, R. 1978, *A&A*, 70, 677
- Chandran, B. D. G. 2000, *Phys. Rev. Lett.*, 85, 4656
- Chibueze, J. O., Akamatsu, H., Parekh, V., et al. 2022, *PASJ*
- Churazov, E., Vikhlinin, A., Zhuravleva, I., et al. 2012, *MNRAS*, 421, 1123
- Clarke, T. E. & Ensslin, T. A. 2006, *AJ*, 131, 2900
- Clavico, S., De Grandi, S., Ghizzardi, S., et al. 2019, *A&A*, 632, A27
- Clowe, D., Bradač, M., Gonzalez, A. H., et al. 2006, *ApJ*, 648, L109
- Cornwell, T. J., Golap, K., & Bhatnagar, S. 2008, *IEEE Journal of Selected Topics in*

- Signal Processing, 2, 647
- Cuciti, V., Brunetti, G., van Weeren, R., et al. 2018, *A&A*, 609, A61
- Cuciti, V., Cassano, R., Brunetti, G., et al. 2021, *A&A*, 647, A51
- Cuciti, V., Cassano, R., Brunetti, G., et al. 2015, *A&A*, 580, A97
- Dasadia, S., Sun, M., Morandi, A., et al. 2016, *MNRAS*, 458, 681
- de Gasperin, F., Rudnick, L., Finoguenov, A., et al. 2022, *A&A*, 659, A146
- de Gasperin, F., van Weeren, R. J., Brüggen, M., et al. 2014, *MNRAS*, 444, 3130
- De Luca, A. & Molendi, S. 2004, *A&A*, 419, 837
- de Plaa, J. 2020, *spex-xray/pyspextools: Pyspextools 0.3.4*
- de Plaa, J., Zhuravleva, I., Werner, N., et al. 2012, *A&A*, 539, A34
- Di Gennaro, G., van Weeren, R. J., Andrade-Santos, F., et al. 2019, *ApJ*, 873, 64
- Di Gennaro, G., van Weeren, R. J., Hoeft, M., et al. 2018, *ApJ*, 865, 24
- Di Gennaro, G., van Weeren, R. J., Rudnick, L., et al. 2021, *ApJ*, 911, 3
- Dominguez-Fernandez, P., Bruggen, M., Vazza, F., et al. 2021, *MNRAS*, 500, 795
- Donahue, M., Ettori, S., Rasia, E., et al. 2016, *ApJ*, 819, 36
- Donnert, J., Vazza, F., Brüggen, M., & ZuHone, J. 2018, *Space Sci. Rev.*, 214, 122
- Drury, L. O. 1983, *Reports on Progress in Physics*, 46, 973
- Eckert, D., Finoguenov, A., Ghirardini, V., et al. 2020, *The Open Journal of Astrophysics*, 3, 12
- Eckert, D., Gaspari, M., Vazza, F., et al. 2017, *ApJ*, 843, L29
- Eckert, D., Jauzac, M., Vazza, F., et al. 2016, *MNRAS*, 461, 1302
- Ensslin, T. A., Biermann, P. L., Klein, U., & Kohle, S. 1998, *A&A*, 332, 395
- Feretti, L., Giovannini, G., Govoni, F., & Murgia, M. 2012, *A&A Rev.*, 20, 54
- Fermi, E. 1949, *Physical Review*, 75, 1169
- Finoguenov, A., Sarazin, C. L., Nakazawa, K., Wik, D. R., & Clarke, T. E. 2010, *ApJ*, 715, 1143
- Fruscione, A., McDowell, J. C., Allen, G. E., et al. 2006, in *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, Vol. 6270, Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, ed. D. R. Silva & R. E. Doxsey, 62701V
- Gaspari, M. & Churazov, E. 2013, *A&A*, 559, A78
- Gaspari, M., Churazov, E., Nagai, D., Lau, E. T., & Zhuravleva, I. 2014, *A&A*, 569, A67
- Gastaldello, F., Marelli, M., Molendi, S., et al. 2022, *arXiv e-prints*, arXiv:2202.05286
- Ghirardini, V., Bahar, E., Bulbul, E., et al. 2021, *arXiv e-prints*, arXiv:2106.15086
- Ghizzardi, S., Rossetti, M., & Molendi, S. 2010, *A&A*, 516, A32
- Giacintucci, S., Markevitch, M., Johnston-Hollitt, M., et al. 2020, *ApJ*, 891, 1
- Gilfanov, M. R., Syunyaev, R. A., & Churazov, E. M. 1987, *Soviet Astronomy Letters*, 13, 3

- Giovannini, G., Bonafede, A., Feretti, L., Govoni, F., & Murgia, M. 2010, *A&A*, 511, L5
- Giovannini, G., Bonafede, A., Feretti, L., et al. 2009, *A&A*, 507, 1257
- Giovannini, G., Feretti, L., Girardi, M., et al. 2011, *A&A*, 530, L5
- Giovannini, G., Tordi, M., & Feretti, L. 1999, *New A*, 4, 141
- Giovannini, G., Vacca, V., Girardi, M., et al. 2013, *MNRAS*, 435, 518
- Gitti, M., Brunetti, G., & Setti, G. 2002, *A&A*, 386, 456
- Gitti, M., Ferrari, C., Domainko, W., Feretti, L., & Schindler, S. 2007, *A&A*, 470, L25
- Golovich, N., Dawson, W. A., Wittman, D. M., et al. 2019a, *ApJS*, 240, 39
- Golovich, N., Dawson, W. A., Wittman, D. M., et al. 2019b, *ApJ*, 882, 69
- Govoni, F., Enßlin, T. A., Feretti, L., & Giovannini, G. 2001, *A&A*, 369, 441
- Govoni, F., Murgia, M., Markevitch, M., et al. 2009, *A&A*, 499, 371
- Gu, L., Zhuravleva, I., Churazov, E., et al. 2018, *Space Sci. Rev.*, 214, 108
- Gunn, J. E. & Gott, J. Richard, I. 1972, *ApJ*, 176, 1
- Hales, S. E. G., Waldram, E. M., Rees, N., & Warner, P. J. 1995, *MNRAS*, 274, 447
- Hallman, E. J. & Markevitch, M. 2004, *ApJ*, 610, L81
- Henry, J. P., Evrard, A. E., Hoekstra, H., Babul, A., & Mahdavi, A. 2009, *ApJ*, 691, 1307
- Herschel, W. 1785, *Philosophical Transactions of the Royal Society of London Series I*, 75, 213
- Hickox, R. C. & Markevitch, M. 2006, *ApJ*, 645, 95
- Hitomi Collaboration, Aharonian, F., Akamatsu, H., et al. 2016, *Nature*, 535, 117
- Hoang, D. N., Shimwell, T. W., Stroe, A., et al. 2017, *MNRAS*, 471, 1107
- Hoang, D. N., Shimwell, T. W., van Weeren, R. J., et al. 2019, *A&A*, 622, A20
- Hoang, D. N., Zhang, X., Stuardi, C., et al. 2021, *A&A*, 656, A154
- Hong, S. E., Kang, H., & Ryu, D. 2015, *ApJ*, 812, 49
- Hoshino, A., Henry, J. P., Sato, K., et al. 2010, *PASJ*, 62, 371
- Hubble, E. P. 1929, *ApJ*, 69, 103
- Hudson, D. S., Mittal, R., Reiprich, T. H., et al. 2010, *A&A*, 513, A37
- Ichinohe, Y., Simionescu, A., Werner, N., Markevitch, M., & Wang, Q. H. S. 2021, *MNRAS*, 504, 2800
- Ichinohe, Y., Simionescu, A., Werner, N., & Takahashi, T. 2017, *MNRAS*, 467, 3662
- Ichinohe, Y., Werner, N., Simionescu, A., et al. 2015, *MNRAS*, 448, 2971
- Intema, H. T. 2014, in *Astronomical Society of India Conference Series*, Vol. 13, *Astronomical Society of India Conference Series*, 469
- Intema, H. T., van der Tol, S., Cotton, W. D., et al. 2009, *A&A*, 501, 1185
- Ishisaki, Y., Maeda, Y., Fujimoto, R., et al. 2007, *PASJ*, 59, 113
- Jaffe, W. J. 1977, *ApJ*, 212, 1
- Jones, F. C. & Ellison, D. C. 1991, *Space Sci. Rev.*, 58, 259
- Kaastra, J. S. 2017, *A&A*, 605, A51

- Kaastra, J. S. & Bleeker, J. A. M. 2016, *A&A*, 587, A151
- Kaastra, J. S., Mewe, R., & Nieuwenhuijzen, H. 1996, in *UV and X-ray Spectroscopy of Astrophysical and Laboratory Plasmas*, 411–414
- Kaastra, J. S., Paerels, F. B. S., Durret, F., Schindler, S., & Richter, P. 2008, *Space Sci. Rev.*, 134, 155
- Kaastra, J. S., Raassen, A. J. J., de Plaa, J., & Gu, L. 2018a, SPEX X-ray spectral fitting package
- Kaastra, J. S., Raassen, A. J. J., de Plaa, J., & Gu, L. 2018b, SPEX X-ray spectral fitting package. Zenodo. <https://doi.org/10.5281/zenodo.2419563>
- Kaastra, J. S., Raassen, A. J. J., de Plaa, J., & Gu, L. 2020a, SPEX X-ray spectral fitting package
- Kaastra, J. S., Raassen, A. J. J., de Plaa, J., & Gu, L. 2020b, SPEX X-ray spectral fitting package (<https://doi.org/10.5281/zenodo.3939056>)
- Kale, R. & Dwarakanath, K. S. 2010, *ApJ*, 718, 939
- Kale, R., Venturi, T., Giacintucci, S., et al. 2015, *A&A*, 579, A92
- Kang, H. 2015, *Journal of Korean Astronomical Society*, 48, 9
- Kang, H. & Jones, T. W. 2002, *Journal of Korean Astronomical Society*, 35, 159
- Kang, H. & Jones, T. W. 2005, *ApJ*, 620, 44
- Kang, H., Jones, T. W., & Gieseler, U. D. J. 2002, *ApJ*, 579, 337
- Kang, H. & Ryu, D. 2011, *ApJ*, 734, 18
- Kang, H., Ryu, D., & Jones, T. W. 2012, *ApJ*, 756, 97
- Kardashev, N. S. 1962, *Soviet Ast.*, 6, 317
- Kempner, J. C. & Sarazin, C. L. 2001, *ApJ*, 548, 639
- Kettula, K., Nevalainen, J., & Miller, E. D. 2013, *A&A*, 552, A47
- Kraft, R. P., Roediger, E., Machacek, M., et al. 2017, *ApJ*, 848, 27
- Kravtsov, A. V. & Borgani, S. 2012, *ARA&A*, 50, 353
- Krymskii, G. F. 1977, *Akademiia Nauk SSSR Doklady*, 234, 1306
- Kuntz, K. D. & Snowden, S. L. 2000, *ApJ*, 543, 195
- Kuntz, K. D. & Snowden, S. L. 2008, *A&A*, 478, 575
- Landau, L. D. & Lifshitz, E. M. 1959, *Fluid mechanics*
- Lehmer, B. D., Xue, Y. Q., Brandt, W. N., et al. 2012, *ApJ*, 752, 46
- Lodders, K., Palme, H., & Gail, H.-P. 2009, 4.4 Abundances of the elements in the Solar System: Datasheet from Landolt-Börnstein - Group VI Astronomy and Astrophysics · Volume 4B: “Solar System” in SpringerMaterials (https://doi.org/10.1007/978-3-540-88055-4_34)
- Lodders, K., Palme, H., & Gail, H. P. 2009, *Landolt-Börnstein*, 4B, 712
- Lovisari, L., Forman, W. R., Jones, C., et al. 2017, *ApJ*, 846, 51
- Lovisari, L., Reiprich, T. H., & Schellenberger, G. 2015, *A&A*, 573, A118
- Machacek, M., Jones, C., Forman, W. R., & Nulsen, P. 2006, *ApJ*, 644, 155
- Macquorn Rankine, W. J. 1870, *Philosophical Transactions of the Royal Society of London Series I*, 160, 277

- Mantz, A. B., Allen, S. W., Morris, R. G., et al. 2016, *MNRAS*, 463, 3582
- Marelli, M., Molendi, S., Rossetti, M., et al. 2021, *ApJ*, 908, 37
- Markevitch, M. 2006, in *ESA Special Publication*, Vol. 604, *The X-ray Universe 2005*, ed. A. Wilson, 723
- Markevitch, M., Gonzalez, A. H., David, L., et al. 2002, *ApJ*, 567, L27
- Markevitch, M., Govoni, F., Brunetti, G., & Jerius, D. 2005, *ApJ*, 627, 733
- Markevitch, M., Mazzotta, P., Vikhlinin, A., et al. 2003, *ApJ*, 586, L19
- Markevitch, M. & Vikhlinin, A. 2007, *Phys. Rep.*, 443, 1
- Markevitch, M., Vikhlinin, A., & Mazzotta, P. 2001, *ApJ*, 562, L153
- Melville, S., Schekochihin, A. A., & Kunz, M. W. 2016, *MNRAS*, 459, 2701
- Menanteau, F., Hughes, J. P., Sifón, C., et al. 2012, *ApJ*, 748, 7
- Mernier, F., de Plaa, J., Lovisari, L., et al. 2015, *A&A*, 575, A37
- Messier, C. 1781, *Catalogue des Nébuleuses et des Amas d'Étoiles (Catalog of Nebulae and Star Clusters)*, *Connaissance des Temps ou des Mouvements Célestes*
- Miniati, F., Ryu, D., Kang, H., et al. 2000, *ApJ*, 542, 608
- Mohr, J. J., Fabricant, D. G., & Geller, M. J. 1993, *ApJ*, 413, 492
- Monteiro-Oliveira, R., Cypriano, E. S., Machado, R. E. G., et al. 2017, *MNRAS*, 466, 2614
- Nelson, K., Lau, E. T., Nagai, D., Rudd, D. H., & Yu, L. 2014, *ApJ*, 782, 107
- Nurgaliev, D., McDonald, M., Benson, B. A., et al. 2013, *ApJ*, 779, 112
- Ogrea, G. A., Brüggén, M., van Weeren, R. J., Burgmeier, A., & Simionescu, A. 2014, *MNRAS*, 443, 2463
- Owers, M. S., Nulsen, P. E. J., Couch, W. J., & Markevitch, M. 2009, *ApJ*, 704, 1349
- Pearce, C. J. J., van Weeren, R. J., Andrade-Santos, F., et al. 2017, *ApJ*, 845, 81
- Perley, R. A. & Butler, B. J. 2013, *ApJS*, 204, 19
- Pinto, C., Fabian, A. C., Ogorzalek, A., et al. 2016, *MNRAS*, 461, 2077
- Pinzke, A., Oh, S. P., & Pfrommer, C. 2013, *MNRAS*, 435, 1061
- Planck Collaboration, Ade, P. A. R., Aghanim, N., et al. 2013, *A&A*, 554, A140
- Planck Collaboration, Ade, P. A. R., Aghanim, N., et al. 2016, *A&A*, 594, A27
- Poole, G. B., Fardal, M. A., Babul, A., et al. 2006, *MNRAS*, 373, 881
- Pratt, G. W., Croston, J. H., Arnaud, M., & Böhringer, H. 2009, *A&A*, 498, 361
- Rajpurohit, K., Hoeft, M., van Weeren, R. J., et al. 2018, *ApJ*, 852, 65
- Rajpurohit, K., Hoeft, M., Vazza, F., et al. 2020, *A&A*, 636, A30
- Rajpurohit, K., van Weeren, R. J., Hoeft, M., et al. 2022, *ApJ*, 927, 80
- Rajpurohit, K., Vazza, F., van Weeren, R. J., et al. 2021, *A&A*, 654, A41
- Rau, U. & Cornwell, T. J. 2011, *A&A*, 532, A71
- Reiprich, T. H., Basu, K., Ettori, S., et al. 2013, *Space Sci. Rev.*, 177, 195
- Rengelink, R. B., Tang, Y., de Bruyn, A. G., et al. 1997, *A&AS*, 124, 259
- Roediger, E., Kraft, R. P., Machacek, M. E., et al. 2012, *ApJ*, 754, 147

- Roncarelli, M., Gaspari, M., Ettori, S., et al. 2018, *A&A*, 618, A39
- Rosen, S. R., Webb, N. A., Watson, M. G., et al. 2016, *A&A*, 590, A1
- Rottgering, H. J. A., Wieringa, M. H., Hunstead, R. W., & Ekers, R. D. 1997, *MNRAS*, 290, 577
- Rudnick, L., Delain, K. M., & Lemmerman, J. A. 2006, *Astronomische Nachrichten*, 327, 549
- Russell, H. R., McNamara, B. R., Sanders, J. S., et al. 2012, *MNRAS*, 423, 236
- Russell, H. R., Sanders, J. S., Fabian, A. C., et al. 2010, *MNRAS*, 406, 1721
- Sabol, E. J. & Snowden, S. L. 2019, *sxrbg: ROSAT X-Ray Background Tool*
- Sanders, J. S. 2006, *MNRAS*, 371, 829
- Santos, J. S., Rosati, P., Tozzi, P., et al. 2008, *A&A*, 483, 35
- Sarazin, C. L. 1988, X-ray emission from clusters of galaxies
- Sarazin, C. L. 2002, in *Astrophysics and Space Science Library*, Vol. 272, *Merging Processes in Galaxy Clusters*, ed. L. Feretti, I. M. Gioia, & G. Giovannini, 1–38
- Schaal, K., Springel, V., Pakmor, R., et al. 2016, *MNRAS*, 461, 4441
- Schekochihin, A. A. & Cowley, S. C. 2006, *Physics of Plasmas*, 13, 056501
- Schellenberger, G., Reiprich, T. H., Lovisari, L., Nevalainen, J., & David, L. 2015, *A&A*, 575, A30
- Schreier, S. 1982, *Compressible Flow*, A Wiley-Interscience publication (Wiley)
- Sekiya, N., Yamasaki, N. Y., Mitsuda, K., & Takei, Y. 2014, *PASJ*, 66, L3
- Serlemitsos, P. J., Soong, Y., Chan, K.-W., et al. 2007, *PASJ*, 59, S9
- Shimwell, T. W., Brown, S., Feain, I. J., et al. 2014, *MNRAS*, 440, 2901
- Shimwell, T. W., Hardcastle, M. J., Tasse, C., et al. 2022, *A&A*, 659, A1
- Shimwell, T. W., Luckin, J., Brüggem, M., et al. 2016, *MNRAS*, 459, 277
- Shimwell, T. W., Röttgering, H. J. A., Best, P. N., et al. 2017, *A&A*, 598, A104
- Simionescu, A., Werner, N., Forman, W. R., et al. 2010, *MNRAS*, 405, 91
- Simionescu, A., ZuHone, J., Zhuravleva, I., et al. 2019, *Space Sci. Rev.*, 215, 24
- Skillman, S. W., Xu, H., Hallman, E. J., et al. 2013, *ApJ*, 765, 21
- Snowden, S. L., Egger, R., Finkbeiner, D. P., Freyberg, M. J., & Plucinsky, P. P. 1998, *ApJ*, 493, 715
- Spitzer, L. 1956, *Physics of Fully Ionized Gases*
- Sreenivasan, K. R. 1995, *Physics of Fluids*, 7, 2778
- Stroe, A., Shimwell, T., Rumsey, C., et al. 2016, *MNRAS*, 455, 2402
- Stroe, A., van Weeren, R. J., Intema, H. T., et al. 2013, *A&A*, 555, A110
- Sun, M., Jones, C., Forman, W., et al. 2006, *ApJ*, 637, L81
- Sunyaev, R. A. & Zeldovich, Y. B. 1972, *Comments on Astrophysics and Space Physics*, 4, 173
- Tawa, N., Hayashida, K., Nagai, M., et al. 2008, *PASJ*, 60, S11
- Tittley, E. R. & Henriksen, M. 2005, *ApJ*, 618, 227
- Urdampilleta, I., Akamatsu, H., Mernier, F., et al. 2018, *A&A*, 618, A74

- van Weeren, R. J., Andrade-Santos, F., Dawson, W. A., et al. 2017, *Nature Astronomy*, 1, 0005
- van Weeren, R. J., Brunetti, G., Brügger, M., et al. 2016a, *ApJ*, 818, 204
- van Weeren, R. J., de Gasperin, F., Akamatsu, H., et al. 2019, *Space Sci. Rev.*, 215, 16
- van Weeren, R. J., Fogarty, K., Jones, C., et al. 2013, *ApJ*, 769, 101
- van Weeren, R. J., Ogreaan, G. A., Jones, C., et al. 2016b, *ApJ*, 817, 98
- van Weeren, R. J., Röttgering, H. J. A., Bagchi, J., et al. 2009, *A&A*, 506, 1083
- van Weeren, R. J., Röttgering, H. J. A., Brügger, M., & Hoeft, M. 2010, *Science*, 330, 347
- van Weeren, R. J., Röttgering, H. J. A., Rafferty, D. A., et al. 2012, *A&A*, 543, A43
- Vazza, F., Brunetti, G., Kritsuk, A., et al. 2009, *A&A*, 504, 33
- Vazza, F., Jones, T. W., Brügger, M., et al. 2017, *MNRAS*, 464, 210
- Vikhlinin, A., Markevitch, M., & Murray, S. S. 2001, *ApJ*, 551, 160
- Voit, G. M., Bryan, G. L., Balogh, M. L., & Bower, R. G. 2002, *ApJ*, 576, 601
- Wang, Q. H. S. & Markevitch, M. 2018, *ApJ*, 868, 45
- Wang, Q. H. S., Markevitch, M., & Giacintucci, S. 2016a, *ApJ*, 833, 99
- Wang, S., Liu, J., Qiu, Y., et al. 2016b, *ApJS*, 224, 40
- Wen, Z. L., Han, J. L., & Liu, F. S. 2012, *ApJS*, 199, 34
- Werner, N., Zhuravleva, I., Churazov, E., et al. 2009, *MNRAS*, 398, 23
- Werner, N., ZuHone, J. A., Zhuravleva, I., et al. 2016, *MNRAS*, 455, 846
- Willingale, R., Starling, R. L. C., Beardmore, A. P., Tanvir, N. R., & O'Brien, P. T. 2013, *MNRAS*, 431, 394
- Wolter, H. 1952, *Annalen der Physik*, 445, 286
- Xi, S.-Q., Wang, X.-Y., Liang, Y.-F., et al. 2018, *Phys. Rev. D*, 98, 063006
- Xu, H., Kahn, S. M., Peterson, J. R., et al. 2002, *ApJ*, 579, 600
- Yoshino, T., Mitsuda, K., Yamasaki, N. Y., et al. 2009, *PASJ*, 61, 805
- Yu, H., Tozzi, P., Borgani, S., Rosati, P., & Zhu, Z. H. 2011, *A&A*, 529, A65
- Yuan, Z. S. & Han, J. L. 2020, *MNRAS*, 497, 5485
- Yuan, Z. S., Han, J. L., & Wen, Z. L. 2015, *ApJ*, 813, 77
- Zhang, C., Churazov, E., Forman, W. R., & Jones, C. 2019a, *MNRAS*, 482, 20
- Zhang, C., Churazov, E., Forman, W. R., & Lyskova, N. 2019b, *MNRAS*, 488, 5259
- Zhang, X. 2021, *Sbfit 0.2.0*
- Zhang, X., Simionescu, A., Akamatsu, H., et al. 2020, *A&A*, 642, A89
- Zhuravleva, I., Churazov, E., Arévalo, P., et al. 2015, *MNRAS*, 450, 4184
- Zhuravleva, I., Churazov, E., Kravtsov, A., & Sunyaev, R. 2012, *MNRAS*, 422, 2712
- Zhuravleva, I., Churazov, E., Schekochihin, A. A., et al. 2014a, *Nature*, 515, 85
- Zhuravleva, I., Churazov, E., Schekochihin, A. A., et al. 2019, *Nature Astronomy*, 3, 832
- Zhuravleva, I., Churazov, E. M., Schekochihin, A. A., et al. 2014b, *ApJ*, 788, L13

- ZuHone, J. & Su, Y. 2022, arXiv e-prints, arXiv:2202.06712
- ZuHone, J. A. 2011, ApJ, 728, 54
- ZuHone, J. A., Markevitch, M., Brunetti, G., & Giacintucci, S. 2013, ApJ, 762, 78
- ZuHone, J. A., Markevitch, M., & Lee, D. 2011, ApJ, 743, 16
- ZuHone, J. A., Markevitch, M., Weinberger, R., Nulsen, P., & Ehlert, K. 2021, ApJ, 914, 73
- ZuHone, J. A., Markevitch, M., & Zhuravleva, I. 2016, ApJ, 817, 110
- Zuhone, J. A. & Roediger, E. 2016, Journal of Plasma Physics, 82, 535820301
- Zwicky, F. 1933, Helvetica Physica Acta, 6, 110