

CURRICULUM VITAE - VICTOR DOROSHENKO

Assistant of the head (Akad. rat), Institute fuer Astronomie und Astrophysik, Universitaet Tuebingen, Germany

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I am an astrophysicist currently employed as assistant of the high energy group at the University of Tuebingen, Germany. My core areas of expertise are studies of compact objects with emphasis on accretion phenomena, equation of state and other properties of neutron stars and of supernova remnants around them, population studies of X-ray binaries and X-ray polarimetry. I conduct a combination of computational, observational and experimental work including taking part in development of new space-based instrumentation, as well as service and teaching work

RESEARCH INTERESTS

Basic properties and astrophysics of accreting compact objects (neutron stars and white dwarf magnetic fields, masses, radii and equation of state) - X-ray polarimetry - Supernova remnants (evolution, interaction with interstellar medium, cosmic ray acceleration), X-ray population studies (source classification in large-scale surveys, relation of observed and intrinsic population properties) - data analysis and ML methods (in application to the above)

RESEARCH IMPACT

Discovery of a plausible **strange star** candidate, first polarimetric observations of X-ray pulsars (XRP), observational detection of transition to super-Eddington accretion regime in Galactic XRP and linking them to extragalactic Ultraluminous X-ray sources (ULX), discovery of the **eROSITA bubbles**, and more as reflected in >179 peer-reviewed publications (30 as first author) including **Science**(4), **Nature**(7), **Nature Astronomy**(4), **A&A**(72), **MNRAS**(33) **ApJ/L**(44) and others with >4200 citations in total and h-index of 33 (source NASA-ADS), multiple invited talks and press-releases.

FUNDING AND OBSERVING TIME

Funding: DFG - **2M€** (400K€ as PI, extension for 2nd funding phase likely to be approved in April 2024 to double those numbers), DAAD - **25K€** (as co-I), RSCF - **70K€** (as co-I), **PI-time:** *XMM-Newton* - **257Ks**, *NuSTAR* - **200Ks**, *Chandra* - **86Ks**, *Swift* - **183Ks**. Plus > **1Ms** as co-I.

SERVICE

Consortium collaboration board member for *eROSITA_DE* (representing Tuebingen); **scientific working group coordinator** for *eROSITA* and *IXPE* (accreting compact objects), *eXTP* (strong magnetism), *Theseus* (observatory science) and *Strobe-X* (daily map team member) consortia; time allocation committee member for *INTEGRAL* and *XMM*; reviewer for several funding proposals; referee for *A&A*, *MNRAS*, *ApJ*, *Nature*, *Nature Astronomy* and others, **section editor** for "Handbook of X-ray and Gamma-ray Astrophysics" by Springer ("compact objects" and "spectral-imaging analysis" sections), SOC/LOC member for several conferences/workshops.

TEACHING AND SUPERVISION

Courses given: "Observational X-ray astronomy" (lectures+seminars), "High energy astrophysics" (lectures+exercises including coordination), "Endpoints of stellar evolution" (lectures), "Astronomy&Astrophysics" (select lectures+exercises and coordination of exercise groups), "Advanced lab for radio astronomy" (including writing manuals).

Students supervised: *PhD* (3): Inga Saathof (2020-2023), Arthur Avakyan (since 2021), Marvin Neuman (co-supervising since 2022), *MSc/e*(8): Mirjam Bogner (2022), Moritz Klawin (2021), Marvin Neumann (2021), Panagiotis Herbe (2020), Davide Cardinale (2018), Giulia Termini (2019), Alexander Landstorfer (2017), Fahim Stuman (2017); *BSc*(4): Nadja Kraus (2023), Moritz Klawin (2020), Marvin Neumann (2020), Simon Treuz (2018).

ACADEMIC CAREER AND EDUCATION

since 07/2017

Akademischer Rat, assistant of the chair, University of Tuebingen, Germany

6/2011 – 6/2017

Post-doctorate researcher, University of Tuebingen, Germany

8/2007 – 4/2011

PhD candidate (*summa cum laude*), University of Tuebingen, Germany

9/2001 – 2/2007

MSc student (Astronomy, *magna cum laude*), Moscow State University, Russia

PUBLICATION LIST

The full and up-to date list is also accessible via ORCID , NASA ADS , and Google scholar  queries.

Highlight publications

- [1] V. Doroshenko, J. Poutanen, S. S. Tsygankov, V. F. Suleimanov, M. Bachetti, I. Caiazzo, E. Costa, A. Di Marco, J. Heyl, F. La Monaca, and et al. “Determination of X-ray pulsar geometry with IXPE polarimetry”. In: *Nature Astronomy* (Oct. 2022). DOI: 10.1038/s41550-022-01799-5. arXiv: 2206.07138 [astro-ph.HE].
- [2] V. Doroshenko, V. Suleimanov, G. Pühlhofer, and A. Santangelo. “A strangely light neutron star within a supernova remnant”. In: *Nature Astronomy* (Oct. 2022). DOI: 10.1038/s41550-022-01800-1.
- [3] V. Doroshenko, S. N. Zhang, A. Santangelo, L. Ji, S. Tsygankov, A. Mushtukov, L. J. Qu, S. Zhang, M. Y. Ge, Y. P. Chen, and et al. “Hot disc of the Swift J0243.6+6124 revealed by Insight-HXMT”. In: *MNRAS* 491.2 (Jan. 2020), pp. 1857–1867. DOI: 10.1093/mnras/stz2879. arXiv: 1909.12614 [astro-ph.HE].
- [4] P. Predehl, R. A. Sunyaev, W. Becker, H. Brunner, R. Burenin, A. Bykov, A. Cherepashchuk, N. Chugai, E. Churazov, V. Doroshenko, and et al. “Detection of large-scale X-ray bubbles in the Milky Way halo”. In: *Nature* 588.7837 (Jan. 2020), pp. 227–231. DOI: 10.1038/s41586-020-2979-0. arXiv: 2012.05840 [astro-ph.GA].
- [5] V. Doroshenko, S. S. Tsygankov, A. e. A. Mushtukov, A. A. Lutovinov, A. Santangelo, V. F. Suleimanov, and J. Poutanen. “Luminosity dependence of the cyclotron line and evidence for the accretion regime transition in V 0332+53”. In: *MNRAS* 466.2 (Apr. 2017), pp. 2143–2150. DOI: 10.1093/mnras/stw3236. arXiv: 1607.03933 [astro-ph.HE].

Other refereed publications

- [1] A. Acharyya, C. B. Adams, A. Archer, P. Bangale, J. T. Bartkoske, P. Batista, W. Benbow, A. Brill, J. H. Buckley, J. L. Christiansen, and et al. “Multiwavelength Observations of the Blazar PKS 0735+178 in Spatial and Temporal Coincidence with an Astrophysical Neutrino Candidate IceCube-211208A”. In: *ApJ* 954.1, 70 (Sept. 2023), p. 70. DOI: 10.3847/1538-4357/ace327. arXiv: 2306.17819 [astro-ph.HE].
- [2] F. Aharonian, F. Ait Benkhali, J. Aschersleben, H. Ashkar, M. Backes, A. Baktash, V. Barbosa Martins, R. Batzofin, Y. Becherini, D. Berge, and et al. “H.E.S.S. Follow-up Observations of GRB 221009A”. In: *ApJ* 946.1, L27 (Mar. 2023), p. L27. DOI: 10.3847/2041-8213/acc405. arXiv: 2303.10558 [astro-ph.HE].
- [3] F. Aharonian, F. A. Benkhali, J. Aschersleben, H. Ashkar, M. Backes, V. B. Martins, J. Barnard, R. Batzofin, Y. Becherini, D. Berge, and et al. “The Vanishing of the Primary Emission Region in PKS 1510-089”. In: *ApJ* 952.2, L38 (Aug. 2023), p. L38. DOI: 10.3847/2041-8213/ace3c0. arXiv: 2307.01692 [astro-ph.HE].
- [4] A. Avakyan, M. Neumann, A. Zainab, V. Doroshenko, J. Wilms, and A. Santangelo. “XRBcats: Galactic low-mass X-ray binary catalogue”. In: *A&A* 675, A199 (July 2023), A199. DOI: 10.1051/0004-6361/202346522. arXiv: 2303.16168 [astro-ph.HE].
- [5] N. Bucciantini, R. Ferrazzoli, M. Bachetti, J. Rankin, N. Di Lalla, C. Sgrò, N. Omodei, T. Kitaguchi, T. Mizuno, S. Gunji, and et al. “Simultaneous space and phase resolved X-ray polarimetry of the Crab pulsar and nebula”. In: *Nature Astronomy* 7 (May 2023), pp. 602–610. DOI: 10.1038/s41550-023-01936-8. arXiv: 2207.05573 [astro-ph.HE].
- [6] F. Capitanio, S. Fabiani, A. Gnarini, F. Ursini, C. Ferrigno, G. Matt, J. Poutanen, M. Cocchi, R. Mikusincova, R. Farinelli, and et al. “Polarization Properties of the Weakly Magnetized Neutron Star X-Ray Binary GS 1826-238 in the High Soft State”. In: *ApJ* 943.2, 129 (Feb. 2023), p. 129. DOI: 10.3847/1538-4357/acaee88. arXiv: 2212.12472 [astro-ph.HE].
- [7] M. Cocchi, A. Gnarini, S. Fabiani, F. Ursini, J. Poutanen, F. Capitanio, A. Bobrikova, R. Farinelli, A. Paizis, L. Sidoli, and et al. “Discovery of strongly variable X-ray polarization in the neutron star low-mass X-ray binary transient XTE J1701–462”. In: *A&A* 674, L10 (June 2023), p. L10. DOI: 10.1051/0004-6361/202346275. arXiv: 2306.10965 [astro-ph.HE].
- [8] L. Di Gesu, H. L. Marshall, S. R. Ehlert, D. E. Kim, I. Donnarumma, F. Tavecchio, I. Liodakis, S. Kiehlmann, I. Agudo, S. G. Jorstad, and et al. “Discovery of X-ray polarization angle rotation in the jet from blazar Mrk 421.” In: *Nature Astronomy* 7 (Oct. 2023), pp. 1245–1258. DOI: 10.1038/s41550-023-02032-7. arXiv: 2305.13497 [astro-ph.HE].
- [9] A. Di Marco, F. La Monaca, J. Poutanen, T. D. Russell, A. Anitra, R. Farinelli, G. Mastroserio, F. Muleri, F. Xie, M. Bachetti, and et al. “First Detection of X-Ray Polarization from the Accreting Neutron Star 4U 1820-303”. In: *ApJ* 953.2, L22 (Aug. 2023), p. L22. DOI: 10.3847/2041-8213/accec6e. arXiv: 2306.08476 [astro-ph.HE].
- [10] V. Doroshenko, J. Poutanen, J. Heyl, S. S. Tsygankov, I. Caiazzo, R. Turolla, A. Veledina, M. C. Weisskopf, S. V. Forsblom, D. González-Caniulef, and et al. “Complex variations in X-ray polarization in the X-ray pulsar LS V +44 17/RX J0440.9+4431”. In: *A&A* 677, A57 (Sept. 2023), A57. DOI: 10.1051/0004-6361/202347088. arXiv: 2306.02116 [astro-ph.HE].
- [11] R. Farinelli, S. Fabiani, J. Poutanen, F. Ursini, C. Ferrigno, S. Bianchi, M. Cocchi, F. Capitanio, A. De Rosa, A. Gnarini, and et al. “Accretion geometry of the neutron star low mass X-ray binary Cyg X-2 from X-ray polarization measurements”. In: *MNRAS* 519.3 (Mar. 2023), pp. 3681–3690. DOI: 10.1093/mnras/stac3726. arXiv: 2212.13119 [astro-ph.HE].

- [12] R. Ferrazzoli, P. Slane, D. Prokhorov, P. Zhou, J. Vink, N. Bucciantini, E. Costa, N. Di Lalla, A. Di Marco, P. Soffitta, and et al. “X-Ray Polarimetry Reveals the Magnetic-field Topology on Sub-parsec Scales in Tycho’s Supernova Remnant”. In: *ApJ* 945.1, 52 (Mar. 2023), p. 52. DOI: 10.3847/1538-4357/acb496. arXiv: 2301.07397 [astro-ph.HE].
- [13] S. V. Forsblom, J. Poutanen, S. S. Tsygankov, M. Bachetti, A. Di Marco, V. Doroshenko, J. Heyl, F. La Monaca, C. Malacaria, H. L. Marshall, and et al. “IXPE Observations of the Quintessential Wind-accreting X-Ray Pulsar Vela X-1”. In: *ApJ* 947.2, L20 (Apr. 2023), p. L20. DOI: 10.3847/2041-8213/acc391. arXiv: 2303.01800 [astro-ph.HE].
- [14] V. E. Gianolli, D. E. Kim, S. Bianchi, B. Agís-González, G. Madejski, F. Marin, A. Marinucci, G. Matt, R. Middei, P. -. Petrucci, and et al. “Uncovering the geometry of the hot X-ray corona in the Seyfert galaxy NGC 4151 with IXPE”. In: *MNRAS* 523.3 (Aug. 2023), pp. 4468–4476. DOI: 10.1093/mnras/stad1697. arXiv: 2303.12541 [astro-ph.GA].
- [15] F. Haberl, C. Maitra, D. Kaltenbrunner, D. A. H. Buckley, I. M. Monageng, A. Udalski, V. Doroshenko, L. Ducci, I. Kreykenbohm, P. Maggi, and et al. “SRG/eROSITA-triggered XMM-Newton observations of three Be/X-ray binaries in the LMC: Discovery of X-ray pulsations”. In: *A&A* 671, A90 (Mar. 2023), A90. DOI: 10.1051/0004-6361/202245807. arXiv: 2302.01804 [astro-ph.HE].
- [16] F. Haberl, G. Vasilopoulos, C. Maitra, F. Valdes, D. Lang, V. Doroshenko, L. Ducci, I. Kreykenbohm, A. Rau, P. Weber, and et al. “eRASSt J040515.6 – 745202, an X-ray burster in the Magellanic Bridge”. In: *A&A* 669, A66 (Jan. 2023), A66. DOI: 10.1051/0004-6361/202245015. arXiv: 2211.06698 [astro-ph.HE].
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- [18] A. Ingram, M. Ewing, A. Marinucci, D. Tagliacozzo, D. J. Rosario, A. Veledina, D. E. Kim, F. Marin, S. Bianchi, J. Poutanen, and et al. “The X-ray polarization of the Seyfert 1 galaxy IC 4329A”. In: *MNRAS* 525.4 (Nov. 2023), pp. 5437–5449. DOI: 10.1093/mnras/stad2625. arXiv: 2305.13028 [astro-ph.HE].
- [19] M. Klawin, V. Doroshenko, A. Santangelo, L. Ji, L. Ducci, Q. Bu, S.-N. Zhang, and S. Zhang. “Centaurus X-3 orbital ephemerides using Insight-HXMT, RXTE, Swift/BAT, and NuSTAR observations”. In: *A&A* 675, A135 (July 2023), A135. DOI: 10.1051/0004-6361/202245181.
- [20] C. Maitra, D. Kaltenbrunner, F. Haberl, D. A. H. Buckley, I. M. Monageng, A. Udalski, S. Carpano, J. B. Coley, V. Doroshenko, L. Ducci, and et al. “Broadband study and the discovery of pulsations from the Be/X-ray binary eRASSU J052914.9–662446 in the Large Magellanic Cloud”. In: *A&A* 669, A30 (Jan. 2023), A30. DOI: 10.1051/0004-6361/202244328. arXiv: 2209.01664 [astro-ph.HE].
- [21] C. Malacaria, J. Heyl, V. Doroshenko, S. S. Tsygankov, J. Poutanen, S. V. Forsblom, F. Capitanio, A. Di Marco, Y. Du, L. Ducci, and et al. “A polarimetrically oriented X-ray stare at the accreting pulsar EXO 2030+375”. In: *A&A* 675, A29 (July 2023), A29. DOI: 10.1051/0004-6361/202346581. arXiv: 2304.00925 [astro-ph.HE].
- [22] F. Marin, E. Churazov, I. Khabibullin, R. Ferrazzoli, L. Di Gesu, T. Barnouin, A. Di Marco, R. Middei, A. Vikhlinin, E. Costa, and et al. “X-ray polarization evidence for a 200-year-old flare of Sgr A*”. In: *Nature* 619.7968 (July 2023), pp. 41–45. DOI: 10.1038/s41586-023-06064-x. arXiv: 2304.06967 [astro-ph.HE].
- [23] R. Middei, I. Liodakis, M. Perri, S. Puccetti, E. Cavazzuti, L. Di Gesu, S. R. Ehlert, G. Madejski, A. P. Marscher, H. L. Marshall, and et al. “X-Ray Polarization Observations of BL Lacertae”. In: *ApJ* 942.1, L10 (Jan. 2023), p. L10. DOI: 10.3847/2041-8213/aca281. arXiv: 2211.13764 [astro-ph.HE].
- [24] R. Middei, M. Perri, S. Puccetti, I. Liodakis, L. Di Gesu, A. P. Marscher, N. Rodriguez Cavero, F. Tavecchio, I. Donnarumma, M. Laurenti, and et al. “IXPE and Multiwavelength Observations of Blazar PG 1553+113 Reveal an Orphan Optical Polarization Swing”. In: *ApJ* 953.2, L28 (Aug. 2023), p. L28. DOI: 10.3847/2041-8213/accc3e. arXiv: 2308.00039 [astro-ph.HE].
- [25] A. A. Mushtukov, S. S. Tsygankov, J. Poutanen, V. Doroshenko, A. Salganik, E. Costa, A. Di Marco, J. Heyl, F. La Monaca, A. A. Lutovinov, and et al. “X-ray polarimetry of X-ray pulsar X Persei: another orthogonal rotator?” In: *MNRAS* 524.2 (Sept. 2023), pp. 2004–2014. DOI: 10.1093/mnras/stad1961. arXiv: 2303.17325 [astro-ph.HE].
- [26] M. Negro, N. Di Lalla, N. Omodei, P. Veres, S. Silvestri, A. Manfreda, E. Burns, L. Baldini, E. Costa, S. R. Ehlert, and et al. “The IXPE View of GRB 221009A”. In: *ApJ* 946.1, L21 (Mar. 2023), p. L21. DOI: 10.3847/2041-8213/acba17. arXiv: 2301.01798 [astro-ph.HE].
- [27] M. Neumann, A. Avakyan, V. Doroshenko, and A. Santangelo. “XRBcats: Galactic High Mass X-ray Binary Catalogue”. In: *A&A* 677, A134 (Sept. 2023), A134. DOI: 10.1051/0004-6361/202245728. arXiv: 2303.16137 [astro-ph.HE].
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- [30] J. Podgorný, L. Marra, F. Muleri, N. Rodriguez Cavero, A. Ratheesh, M. Dovčiak, R. Mikušincová, M. Brigitte, J. F. Steiner, A. Veledina, and et al. “The first X-ray polarimetric observation of the black hole binary LMC X-1”. In: *MNRAS* 526.4 (Dec. 2023), pp. 5964–5975. DOI: 10.1093/mnras/stad3103. arXiv: 2303.12034 [astro-ph.HE].

- [31] N. Rodriguez Cavero, L. Marra, H. Krawczynski, M. Dovčiak, S. Bianchi, J. F. Steiner, J. Svoboda, F. Capitanio, G. Matt, M. Negro, and et al. “The First X-Ray Polarization Observation of the Black Hole X-Ray Binary 4U 1630-47 in the Steep Power-law State”. In: *ApJ* 958.1, L8 (Nov. 2023), p. L8. DOI: 10.3847/2041-8213/acfd2c. arXiv: 2305.10630 [astro-ph.HE].
- [32] R. W. Romani, J. Wong, N. Di Lalla, N. Omodei, F. Xie, C. -. Ng, R. Ferrazzoli, A. Di Marco, N. Bucciantini, M. Pilia, and et al. “The Polarized Cosmic Hand: IXPE Observations of PSR B1509-58/MSH 15-5²”. In: *ApJ* 957.1, 23 (Nov. 2023), p. 23. DOI: 10.3847/1538-4357/acfa02. arXiv: 2309.16067 [astro-ph.HE].
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- [35] V. F. Suleimanov, J. Poutanen, V. Doroshenko, and K. Werner. “Expected polarization properties of nonmagnetized CCOs”. In: *A&A* 673, A15 (May 2023), A15. DOI: 10.1051/0004-6361/202346092. arXiv: 2303.01382 [astro-ph.HE].
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- [37] S. S. Tsygankov, V. Doroshenko, A. A. Mushtukov, J. Poutanen, A. Di Marco, J. Heyl, F. La Monaca, S. V. Forsblom, C. Malacaria, H. L. Marshall, and et al. “X-ray pulsar GRO J1008–57 as an orthogonal rotator”. In: *A&A* 675, A48 (July 2023), A48. DOI: 10.1051/0004-6361/202346134. arXiv: 2302.06680 [astro-ph.HE].
- [38] R. Turolla, R. Taverna, G. L. Israel, F. Muleri, S. Zane, M. Bachetti, J. Heyl, A. Di Marco, E. Gau, H. Krawczynski, and et al. “IXPE and XMM-Newton Observations of the Soft Gamma Repeater SGR 1806-20”. In: *ApJ* 954.1, 88 (Sept. 2023), p. 88. DOI: 10.3847/1538-4357/aced05. arXiv: 2308.01238 [astro-ph.HE].
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