Sedighe Sajadian

Curriculum Vitae

Department of Physics
Isfahan University of Technology
(+98) 9179965712
s.sajadian@iut.ac.ir
https://sajadian.iut.ac.ir/
www.linkedin.com/in/sedighe-sajadian-9020a237/
github.com/SSajadian54

Education

2007–2011: **PhD of Physics, Astrophysics**, *Physics Department, Sharif University of Technology*, Tehran, Iran.
Studying detection of exo-planet by microlensing; Ph.D. Supervisor: S. Rahvar

CGPA: 18.37/20

2005–2007: **Master of Physics, Particle physics**, *Physics department, Sharif University of Technology*, Tehran, Iran.
Studying dynamic symmetry of Hydrogen atom; M.Sc. Supervisor: F. Ardalan

CGPA: 18.09/20

2001–2005: **Bachelor of Physics**, *Shahid-Chamran University*, Ahvaz, Iran.

CGPA: 18.27/20

Employment History

2017-present **Assistant professor**, Physics department, Isfahan University of Technology, Isfahan, Iran.

2015-2016 **Postdoctoral researcher**, Physics department, Sharif University of Technology, Tehran, Iran.

2011-2014 **Postdoctoral researcher**, School of Astronomy, IPM, Tehran, Iran.

Professional Memberships

2022, 22 Dec (comming) Chair of organizing committee in ***Physics Day* Workshop** for high school students from Isfahan province, Physics Department, Isfahan University of Technology(Outreach activity)

2022, 28-29 July Chair of scientific committee in ***Transient events and Multi-messenger astrophysics* Workshop**, Physics Department, Isfahan University of Technology in cooperation with INO, and IPM.

2018, Jan Chair of organizing committee in ***National conference on gravitation and cosmology***, Physics Department, Isfahan University of Technology.

2016, Dec Organizer and lecturer in ***Searching stellar brightness curves* Workshop** in Physics Department, Sharif University of Technology, Tehran.

2016 –present **Member of MiNDSTEp consortium**, a follow-up observing group for on-going microlensing events with the Danish 1.54 m telescope.

2017 –present Reviewer of **MNRAS, MNRAS Letter, The Astronomical Journal, and Iranian Journal of Physics Research**.

Professional Experience

2017-present **Data-reduction** of images taken by the Lucky Imaging camera on the Danish telescope with DANDIA pipeline.

2021 Working with **IRAF/ DAOPHOT** for images taken with the Danish telescope.

2022 Using **Supervised Machine Learning** for microlensing data analysis and for Gaia data.

2016-present **On-site and remote observations**, Danish 1.54 m telescope, La Silla observatory, Chile.

Fellowships, Awards, & Honors

Grants

2020-2021 Research **Grant** from Prof. Han, Department of Physics, Chungbuk National univbersity. I was his researcher for one year.

2017-2019 **Grant** for accomplishing a research project Extra solar planets: detection, formation, from *Iran Science National Foundation(ISNF)*, No: INSF-95843339.

2016-2017 **Grant** for accomplishing a research project polarimetry microlensing, from *Iran Science National Foundation (ISNF)*, No: INSF-94017434.

2015-2016 **Grant** for publishing ISI papers in Q1 journals, from *Iran Science Elites Federation*.

Honors

2005 Ranked 54th in the **M.Sc. Qualifying Exam** with more 50000 participants.

2001-2005 Ranked 1th during **B.Sc. program in Physics Department**, Shahid-Chamran University.

2006–2010 Membership in **Exceptional Talent Academy**, Sharif University of Technology, Tehran.

2003–2005 Membership in **Exceptional Talent Academy**, Shahid-Chamran University, Ahvaz.

Teaching

2022, Spring **Analytical mechanic I** for undergraduate students, physics department, Isfahan University of Technology.

2018, 2019, 2022 **Astrophysics** for undergraduate students, Physics Department, Isfahan University of Technology.

2019, 2021, 2022 **Cosmology & Special topics in cosmology** for graduate students, Physics Department, Isfahan University of Technology.

2017-present **Fundamental Physics I (calculus-based)** fall semesters for undergraduate and engineering students, Isfahan University of Technology.

2017-present **Fundamental Physics II (calculus-based)** spring semesters for undergraduate and engineering students, Isfahan University of Technology.

Supervising projects

Bachelor projects

2022- ***Setareh Moein***; Thesis: Studying stellar atmosphere modelling with *MARCS* code.

2022, Sep ***Hossein Fatheddin***; Thesis: New method to solve binary-lens equation (**Results published**).

2021, Nov ***Ehsan Goreishi***; Thesis: Studying age-velocity relation in Gaia data.

2020, Sep ***Melika Sarrami***; Thesis: Finite-source effect in shoft-duration microlensing events.

2020, Sep ***Mahshad Rashidi***; Thesis: Characterizing microlensing light curves from spotted stars (**Results published**).

2019, July ***Ali Salehi***; Thesis: Detecting inner regions of protoplanetary discs around sources of microlensing with WFIRST Survey (**Results published**).

Master projects

2022- ***Sina Hematian***; Thesis: Applications of Machine Learning approaches in microlensing observations

2022- ***Aref Asadi***; Thesis: Studying consistency between Gaia data and Besancon model

2021- ***AliReza Zareshahi***; Thesis: On the detection of free-floating moon-planet systems through microlensing observations.

2021- ***AmirAli Tavajoh***; Thesis: Improving Newton's and Laguerre's methods for solving binary-lens equations.

2021 ***Neda Kalantari***; Thesis: Studying possibility pf spectro-polarimetry observations from microlensing events.

2020 ***Fatemeh Kazemian***; Thesis: Mass-Velocity Dispersion Relation by using the Gaia Data and its effect on short-duration microlensing events (**Results published**).

2019 ***Parisa Sangtarash***; Thesis: Gravitational microlensing from limb-darkened source stars (**Results published**).

2018 ***Banafshe Adami***; Thesis: A review on data-reduction process of microlensing events (**Results published**).

2017 ***Mariyam Javadizadeh***; Thesis: Circumstellar disk perturbations on microlensing light curves.

PhD. projects

2021- ***Parisa Sangtarash***; Thesis: Gravitational Microlensing of variable stars toward M31.

2020 ***Elahe Khalouei***; Co-supervisor; Thesis: Measuring stellar atmosphere parameters using follow-up polarimetric microlensing observations (**Results published**).

2019 ***Fatemeh Bagheri***; Advisor; Thesis: Exoplanet detection through space-based microlensing observation (**Results published**).

Publications

2022 Fatheddin, Hossein and **Sedighe Sajadian** (Dec. 2022a). "A Statistical Relation between Mass, Age and Velocity Dispersion in the Solar Neighborhood". In: *arXiv e-prints*, arXiv:2212.13349, arXiv:2212.13349. arXiv: 2212.13349 [astro-ph.GA].

— (Aug. 2022b). "Improved Aberth-Ehrlich root-finding algorithm and its further application for binary microlensing". In: ***MNRAS*** 514.3, pp. 4379–4384. DOI: 10.1093/mnras/stac1565. arXiv: 2206.00482 [astro-ph.IM].

Herald, A. et al. (July 2022). "Precision measurement of a brown dwarf mass in a binary system in the microlensing event. OGLE-2019-BLG-0033/MOA-2019-BLG-035". In: ***A &A*** 663, A100, A100. DOI: 10.1051/0004-6361/202243490. arXiv: 2203.04034 [astro-ph.SR].

Rożek, Agata et al. (Sept. 2022). "Physical properties of near-Earth asteroid (2102) Tantalus from multiwavelength observations". In: ***MNRAS*** 515.3, pp. 4551–4564. DOI: 10.1093/mnras/stac1835. arXiv: 2206.14306 [astro-ph.EP].

Sahu, Kailash C. et al. (July 2022). "An Isolated Stellar-mass Black Hole Detected through Astrometric Microlensing". In: ***ApJ*** 933.1, 83, p. 83. DOI: 10.3847/1538-4357/ac739e. arXiv: 2201.13296 [astro-ph.SR].

Sajadian, **S.** and U. G. Jørgensen (Jan. 2022). "Variation of the stellar color in high-magnification and caustic-crossing microlensing events". In: ***A &A*** 657, A16, A16. DOI: 10.1051/0004-6361/202141623. arXiv: 2109.14413 [astro-ph.EP].

Sajadian, **Sedighe**, Sohrab Rahvar, and Fatemeh Kazemian (Sept. 2022). "Mass-Velocity Dispersion Relation by Using the Gaia Data and Its Effect on Interpreting Short-duration and Degenerate Microlensing Events". In: ***AJ*** 164.3, 112, p. 112. DOI: 10.3847/1538-3881/ac82e9. arXiv: 2103.10593 [astro-ph.SR].

Southworth, John, A. J. Barker, et al. (Sept. 2022). "A search for transit timing variations in the HATS-18 planetary system". In: ***MNRAS*** 515.3, pp. 3212–3223. DOI: 10.1093/mnras/stac1931. arXiv: 2207.05873 [astro-ph.EP].

Southworth, John, L. Mancini, et al. (July 2022). "VLT, GROND and Danish Telescope observations of transits in the TRAPPIST-1 system". In: *arXiv e-prints*, arXiv:2207.05874, arXiv:2207.05874. arXiv: 2207.05874 [astro-ph.EP].

2021 Kelley, Michael S. P. et al. (Aug. 2021). "Six Outbursts of Comet 46P/Wirtanen". In: 2.4, 131, p. 131. DOI: 10.3847/PSJ/abfe11.

Khalouei, Elahe, **Sedighe Sajadian**, and Sohrab Rahvar (Mar. 2021). "Measuring stellar atmosphere parameters using follow-up polarimetric microlensing observations". In: ***MNRAS*** 501.3, pp. 3203–3214. DOI: 10.1093/mnras/staa3492. arXiv: 2011.03642 [astro-ph.SR].

Kondo, Iona et al. (Aug. 2021). "OGLE-2018-BLG-1185b: A Low-mass Microlensing Planet Orbiting a Low-mass Dwarf". In: ***AJ*** 162.2, 77, p. 77. DOI: 10.3847/1538-3881/ac00ba. arXiv: 2104.02157 [astro-ph.EP].

Sajadian, **Sedighe** (Sept. 2021a). "On the detection of free-floating planets through microlensing towards the Magellanic Clouds". In: ***MNRAS*** 506.3, pp. 3615–3628. DOI: 10.1093/mnras/stab1907. arXiv: 2107.02954 [astro-ph.EP].

— (Dec. 2021b). "Sensitivity to habitable planets in the Roman microlensing survey". In: ***MNRAS*** 508.4, pp. 5991–6000. DOI: 10.1093/mnras/stab2942. arXiv: 2110.05751 [astro-ph.EP].

Sajadian, **Sedighe**, Richard Ignace, and Hilding Neilson (Nov. 2021). "Identifying low-amplitude pulsating stars through microlensing observations". In: ***MNRAS*** 507.4, pp. 5177–5186. DOI: 10.1093/mnras/stab2410. arXiv: 2108.08650 [astro-ph.SR].

Sajadian, **Sedighe** and Mahshad Rishidi (Aug. 2021). "Perturbation effect of stellar spots on light curves of gravitational microlensing". In: ***IJPR*** 21.2, 293, p. 293. DOI: 10.47176/ijpr.21.2.91118.

2020 Hirao, Yuki et al. (Aug. 2020). "OGLE-2017-BLG-0406: Spitzer Microlens Parallax Reveals Saturn-mass Planet Orbiting M-dwarf Host in the Inner Galactic Disk". In: ***AJ*** 160.2, 74, p. 74. DOI: 10.3847/1538-3881/ab9ac3. arXiv: 2004.09067 [astro-ph.EP].

Hitchcock, J. A. et al. (July 2020). "Large-scale changes of the cloud coverage in the Indi Ba and Bb system". In: ***MNRAS*** 495.4, pp. 3881–3899. DOI: 10.1093/mnras/staa1344. arXiv: 2005.06906 [astro-ph.SR].

Sajadian, **Sedighe** and Richard Ignace (May 2020a). "Microlensing of radially pulsating stars". In: ***MNRAS*** 494.2, pp. 1735–1743. DOI: 10.1093/mnras/staa837. arXiv: 2003.10318 [astro-ph.SR].

— (Oct. 2020b). "Non-radially pulsating stars as microlensing sources". In: ***MNRAS*** 498.1, pp. 223–234. DOI: 10.1093/mnras/staa2429. arXiv: 2008.04171 [astro-ph.SR].

Sajadian, **Sedighe** and Ali Salehi (Oct. 2020). "Detecting the inner regions of discs around sources of microlensing with Roman Space Telescope". In: ***MNRAS*** 498.1, pp. 1298–1307. DOI: 10.1093/mnras/staa2377. arXiv: 2008.02847 [astro-ph.SR].

Sangtarash, Parisa and **Sedighe Sajadian** (Jan. 2020). "Limb-darkening effect of source stars in gravitational microlensing observations in different filters". In: ***IJPR*** 20.3, 495, p. 495. DOI: 10.47176/ijpr.20.3.71096.

Zang, Weicheng et al. (Mar. 2020). "Spitzer Microlensing Parallax Reveals Two Isolated Stars in the Galactic Bulge". In: ***ApJ*** 891.1, 3, p. 3. DOI: 10.3847/1538-4357/ab6ff8. arXiv: 1904.11204 [astro-ph.SR].

2019 Bagheri, Fatemeh, **Sedighe Sajadian**, and Sohrab Rahvar (Dec. 2019). "Detection of exoplanet as a binary source of microlensing events in WFIRST survey". In: ***MNRAS*** 490.2, pp. 1581–1587. DOI: 10.1093/mnras/stz2682. arXiv: 1909.11559 [astro-ph.EP].

Li, S. -S. et al. (Sept. 2019). "OGLE-2017-BLG-1186: first application of asteroseismology and Gaussian processes to microlensing". In: ***MNRAS*** 488.3, pp. 3308–3323. DOI: 10.1093/mnras/stz1873. arXiv: 1904.07718 [astro-ph.SR].

Sajadian, **Sedighe** (July 2019). "Polarization in caustic-crossing binary microlensing events". In: ***MNRAS*** 487.1, pp. 908–918. DOI: 10.1093/mnras/stz1294. arXiv: 1905.02935 [astro-ph.IM].

Sajadian, **Sedighe**, Banafshe Adami, and MohammadReza Mohama (Feb. 2019). "Review on data reduction process of microlensing events". In: ***IJPR*** 19.4, 815, p. 815. DOI: 10.47176/ijpr.19.4.27882.

Sajadian, **Sedighe** and Radosław Poleski (Feb. 2019). "Predictions for the Detection and Characterization of Galactic Disk Microlensing Events by LSST". In: ***ApJ*** 871.2, 205, p. 205. DOI: 10.3847/1538-4357/aafa1d. arXiv: 1806.06372 [astro-ph.IM].

Sajadian, **Sedighe** and Sohrab Rahvar (Aug. 2019). "The effect of variation of stellar dispersion velocities by the galactic latitude in interpreting gravitational microlensing observations". In: ***IJPR*** 19.2, 391, p. 391. DOI: 10.29252/ijpr.19.2.391.

Shvartzvald, Yossi et al. (Mar. 2019). "Spitzer Microlensing Parallax for OGLE-2017-BLG-0896 Reveals a Counter-rotating Low-mass Brown Dwarf". In: ***AJ*** 157.3, 106, p. 106. DOI: 10.3847/1538-3881/aafe12. arXiv: 1805.08778 [astro-ph.SR].

Southworth, John, M. Dominik, et al. (Dec. 2019). "Transit timing variations in the WASP-4 planetary system". In: ***MNRAS*** 490.3, pp. 4230–4236. DOI: 10.1093/mnras/stz2602. arXiv: 1907.08269 [astro-ph.EP].

Street, R. A. et al. (June 2019). "OGLE-2018-BLG-0022: A Nearby M-dwarf Binary". In: ***AJ*** 157.6, 215, p. 215. DOI: 10.3847/1538-3881/ab1538. arXiv: 1903.08733 [astro-ph.EP].

2018 Evans, D. F. et al. (Feb. 2018). "High-resolution Imaging of Transiting Extrasolar Planetary systems (HITEP). II. Lucky Imaging results from 2015 and 2016". In: ***A &A*** 610, A20, A20. DOI: 10.1051/0004-6361/201731855. arXiv: 1709.07476 [astro-ph.EP].

Han, C. et al. (June 2018). "OGLE-2017-BLG-0329L: A Microlensing Binary Characterized with Dramatically Enhanced Precision Using Data from Space-based Observations". In: ***ApJ*** 859.2, 82, p. 82. DOI: 10.3847/1538-4357/aabd87. arXiv: 1802.10196 [astro-ph.SR].

Ryu, Y. -H. et al. (Jan. 2018). "OGLE-2016-BLG-1190Lb: The First Spitzer Bulge Planet Lies Near the Planet/Brown-dwarf Boundary". In: ***AJ*** 155.1, 40, p. 40. DOI: 10.3847/1538-3881/aa9be4. arXiv: 1710.09974 [astro-ph.EP].

Udalski, A. et al. (Mar. 2018). "OGLE-2017-BLG-1434Lb: Eighth q<1 10^{-4} Mass-Ratio Microlens Planet Confirms Turnover in Planet Mass-Ratio Function". In: 68.1, pp. 1–42. DOI: 10.32023/0001-5237/68.1.1. arXiv: 1802.02582 [astro-ph.EP].

2017 Moniez, M. et al. (Aug. 2017). "Understanding EROS2 observations toward the spiral arms within a classical Galactic model framework". In: ***A &A*** 604, A124, A124. DOI: 10.1051/0004-6361/201730488. arXiv: 1701.07006 [astro-ph.GA].

Sajadian, **Sedighe** and Markus Hundertmark (Apr. 2017). "Polarimetry Microlensing of Close-in Planetary Systems". In: ***ApJ*** 838.2, 157, p. 157. DOI: 10.3847/1538-4357/aa67e1. arXiv: 1704.01846 [astro-ph.EP].

2016 **Sajadian**, **Sedighe** (July 2016). "Stellar Rotation Effects in Polarimetric Microlensing". In: ***ApJ*** 825.2, 152, p. 152. DOI: 10.3847/0004-637X/825/2/152. arXiv: 1605.07741 [astro-ph.SR].

Sajadian, **Sedighe**, Sohrab Rahvar, Martin Dominik, et al. (May 2016). "The advantages of using a Lucky Imaging camera for observations of microlensing events". In: ***MNRAS*** 458.3, pp. 3248–3259. DOI: 10.1093/mnras/stw526. arXiv: 1603.00729 [astro-ph.IM].

2015 **Sajadian**, **Sedighe** (Apr. 2015a). "Binary Astrometric Microlensing with Gaia". In: ***AJ*** 149.4, 147, p. 147. DOI: 10.1088/0004-6256/149/4/147. arXiv: 1504.02932 [astro-ph.SR].

— (Sept. 2015b). "Detecting stellar spots through polarimetric observations of microlensing events in caustic-crossing". In: ***MNRAS*** 452.3, pp. 2587–2596. DOI: 10.1093/mnras/stv1349. arXiv: 1506.08359 [astro-ph.SR].

Sajadian, **Sedighe** and Sohrab Rahvar (Sept. 2015a). "Photometric, astrometric and polarimetric observations of gravitational microlensing events". In: ***MNRAS*** 452.3, pp. 2579–2586. DOI: 10.1093/mnras/stu1875. arXiv: 1409.2653 [astro-ph.SR].

Sajadian, **Sedighe** and Sohrab Rahvar (Dec. 2015b). "Polarimetric microlensing of circumstellar discs". In: ***MNRAS*** 454.4, pp. 4429–4439. DOI: 10.1093/mnras/stv2297. arXiv: 1510.01856 [astro-ph.SR].

2014 **Sajadian**, **Sedighe** (Apr. 2014). "Orbital motion effects in astrometric microlensing". In: ***MNRAS*** 439.3, pp. 3007–3015. DOI: 10.1093/mnras/stu158. arXiv: 1401.6416 [astro-ph.IM].

2012 **Sajadian**, **Sedighe** and Sohrab Rahvar (Jan. 2012). "Simulation of a strategy for the pixel lensing of M87 using the Hubble Space Telescope". In: ***MNRAS*** 419.1, pp. 124–131. DOI: 10.1111/j.1365-2966.2011.19671.x. arXiv: 1108.4187 [astro-ph.GA].

2010 — (Sept. 2010). "Illuminating hot Jupiters in caustic crossing". In: ***MNRAS*** 407.1, pp. 373–380. DOI: 10.1111/j.1365-2966.2010.16901.x. arXiv: 1004.3907 [astro-ph.EP].

Selected Talks in Conferences & Meetings

2022, Sep **25th Microlensing Conference**, Institut d'Astrophysique de Paris (IAP), Paris. Title: Sensitivity to habitable planets in the Roman microlensing survey.

2021, Feb In weekly meeting, **Physics Department, Isfahan university of Technology**. Title: Detecting isolated blackholes in the Galactic disk through astrometric microlensing.

2021, April In weekly meeting, **Physics Department, Cambridge university**. Title: Gravitational microlensing: Observation and Interpretation.

2020, July In weekly meeting, **Physics Department, Sharif University of Technology**. Title: Microlensing and variable stars.

2018, Nov In monthly meeting, **Isfahan physics club**, Isfahan, Iran. Title: Observation with Danish 1.54m telescope.

2017, Dec In monthly meeting, **Adib center of astronomy learning**, Isfahan, Iran. Title: Planetary systems observations.

2016, March **Annual meeting of the MiNDSTEp consortium**, Salerno University, Italy. Title: The advantages of using Lucky Imaging camera for observations of planetary microlensing.

2013, Jan **National Conference on Gravitation and Cosmology**, Shahid Beheshti Uiversity, Iran. Title: Astrometric properties of gravitational lenses.

2012, May **IPM Physics Spring Conference**, IPM, Iran. Title: Detecting gravitational microlensing by Lucky imaging camera.

2010, May **Meeting on Research in Astronomy**, IASBS, Zanjan. Title: Detecting hot Jupiters in caustic crossing.

Computer skills

Programming Languages: Python, C, C++, IDL, Fortran, Mathematica

Scientific Tools: Iraf (worked with DAOPHOT), DS9, DANDIA

Database: SQL, pandas, Machine Learning (worked with scikit-learn)

Interests

Sport: Mountain climbing, Running

Reading book.: I enjoy reading books very much, especially self-help books, novels, etc.

Referees

Prof. Uffe G. Jørgensen
Professor, Niels Bohr Institute
Denmark
(+45) 61306640
uffegj@nbi.ku.dk

Prof. Richard Ignace
Professor, Department of Physics
East Tennessee state university
(+1) 4234396904
IGNACE@mail.etsu.edu

Dr. Markus Hundertmark
Researcher, Department of Physics
Heidelberg University
(+49) 6221541867
markus.hundertmark@uni-heidelberg.de