Mohsen Shadmehri

Curriculum Vita

December 2025

Personal Data:

Full name: Mohsen Shadmehri
Date of Birth: 1974
Marital Status: Married
Nationality: Iranian
Place of Birth: Mashhad

University Address:
Physics Department, Faculty of Science,
Golestan University, Gorgan
Iran

E-mail:
m.shadmehri@gu.ac.ir
mmshadmehri@gmail.com

● University degrees:

PhD (***Theoretical Astrophysics***, Mar. 2002), Ferdowsi Univ., Mashhad, Iran
Title of PhD thesis: Equilibria And Quasi-Hydrostatic Collapse Of Self-Gravitating Systems

M.Sc (***Theoretical Astrophysics***, Sep. 1998), Ferdowsi Univ., Mashhad, Iran
Title of MSc thesis: Thermal instability in ISM

B.Sc (***Physics***, Sep. 1996), Ferdowsi University, Mashhad, Iran

● Research interests:

My current research interests in **theoretical astrophysics**:

- theories of star formation
- structure and dynamics of protostars

- cluster of stars and formation of stellar systems
- accretion processes in astrophysics

Professional membership:

- International Astronomical Society (IAU)
- Iranian Physical Society
- Iranian Astronomical Society

Lecturing Experiences at University Level:

I have been lecturing at *undergraduate* and *graduate* levels. The list of undergraduate and post-graduate courses are listed below

Undergraduate Courses: (first year through to final year students)

Introduction to Astronomy
Astrophysics
Space Physics (Planetary Science)
Analytical Mechanics I
Analytical Mechanics II
Computer Programming (Fortran)
Mathematical Physics I
Mathematical Physics II
Mathematical Physics III
Elementary Physics I (Mechanics)
Elementary Physics II (Electromagnetism)
Elementary Physics III (Heat & Thermodynamics)

Graduate Courses:

Astrophysical MHD Fluids
(with applications in modeling accretion processes, star formation)

Stellar Structure and Evolution
Galactic Dynamics
Advanced Classical Mechanics
Electrodynamics
Statistical Mechanics
Observational
Astronomy

Current position:

Associate Professor, Physics Department, Faculty of Science, Golestan University, Gorgan, Iran

Computer experience:

- Operating system: Linux, MS Windows
- Programing Languages: Fortran 77, Fortran 90/95, python
- Experience with: MAPLE, IDL, LATEX

Conferences & Workshops attended (incomplete):

- Annual Iranian astronomy Conference, Institute for Advanced Studies in Basic Sciences, Iran (2006) *Gravitational collapse of Non-isothermal self-gravitating filamentary clouds*
- IAU Symposium 227, Massive Star Birth: A Crossroads Of Astrophysics, Acireale, Italy, 16-20 May (2005) *Variability in the stellar initial mass function at high mass: coalescence models*
- The 12th IPM Spring Theoretical Physics Conference, IPM, Tehran, Iran, 11-12 May (2005) *Evolution of Molecular Cloud Cores*
- Annual Iranian astronomy Conference, Ferdowsi University, Iran (2004)
- Annual Iranian astronomy Conference, Ferdowsi University, Iran (2003)
- ACCRETION DISCS, JETS AND HIGH ENERGY PHENOMENA IN ASTROPHYSICS, Nato Advanced Study Institute – EuroSummerSchool July 29 to August 23 (2002), France
- Seeing Through the Dust: The Detection of HI and the Exploration of the ISM in Galaxies, Penticton, Biritish Columbia, Canada (20-25 October 2001) *Virial theorem analysis of the turbulent 3D numerical simulations of the ISM*

- JENAM 2001: "Five Days of Creation" (10th European and 75th Annual Assembly of Astronomische Gesellschaft), Max-Planck-Institut fur Astrophysik, Germany (September 2001) *(a) Self-similar equilibria of self-gravitating, magnetized, rotating, isothermal systems (b) Equilibria of a self-gravitating rotating disk around a magnetized compact object*
- Annual Iranian astronomy Conference, Institute for Advanced Studies in Basic Sciences, Iran (2001) *Nonaxisymmetric Equilibria of Self-Gravitating Systems*
- Annual Iranian astronomy Conference, Institute for Advanced Studies in Basic Sciences, Iran (2000) *Stability Of Self-Gravitating Filamentary Molecular Clouds*
- Annual Iranian astronomy Conference, Institute for Advanced Studies in Basic Sciences, Iran (1999)
- Sixteenth Annual Iranian Physics Conference, Babolsar University (1999)
- Annual Iranian astronomy Conference, Institute for Advanced Studies in Basic Sciences, Iran (1998)
- Fifteenth Annual Iranian Physics Conference, Kerman University, Iran (1998)
- Annual Iranian astronomy Conference, Institute for Advanced Studies in Basic Sciences, Iran (1997) MHD waves in ISM
- Fourteenth Annual Iranian Physics Conference, Gilan University, Iran (1997)
- Annual Iranian astronomy Conference, Institute for Advanced Studies in Basic Sciences, Iran (1996) *Solitons And Thermal Instability In ISM*
- Thirteenth Annual Iranian Physics Conference, Mashhad University, Iran (1996)

● List of publications:

Papers in refereed journals:

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1. Dib, S., Zhou, J.W., Comeron, S., *Shadmehri, Mohsen*, Doughty, J.R.
Assessing the accuracy of star formation rate measurements by direct star count in molecular clouds
A&A, 693, 51 (2025)

1. *Shadmehri, Mohsen;* Khajenabi, Fazeleh
Analytical solutions for the evolution of MHD wind-driven accretion discs
MNRAS, 528, 3294 (2024)

1. Habibi, Asiyeh; Abbassi, Shahram; *Shadmehri, Mohsen*
Exact analytical solutions for ADAFs
MNRAS, 464, 5028 (2017)

1. Ghoreyshi, S.M.; *Shadmehri, Mohsen*
The self-similar structure of advection-dominated discs with outflow and radial viscosity

MNRAS, 493, 5107 (2020)

2. *Shadmehri, Mohsen*; Khajenabi, Fazeleh; Dib, Sami
Structure of radiation-dominated gravitoturbulent quasar discs
MNRAS, 464, 4018 (2017)

3. *Shadmehri, Mohsen*; Oudi, Razieh; Rastegarzade, Gohar
Drag-driven instability of a dust layer in a magnetized protoplanetary disc
Research in Astronomy and Astrophysics, 16, 134 (2016)

4. *Mohsen Shadmehri*
Analysis of the Instability Due to Gas-Dust Friction in Protoplanetary Disks
The Astrophysical Journal, 817, 140 (2016)

5. *Mohsen Shadmehri*
On the orbital motion of cold clouds in broad-line regions
MNRAS, 451, 3671 (2015)

6. *Mohsen Shadmehri*, Fazeleh Khajenabi
On the location of the ice line in circumbinary discs

MNRAS, 447, 1439 (2015)

7. *Mohsen Shadmehri*
Analytical Solutions for the structure of ADAFs
MNRAS, 442, 3528 (2014)

8. Anatoly K. Nekrasov, *Mohsen Shadmehri*
Influence of the backreaction of Streaming Cosmics rays on magnetic field generation and thermal instability
The Astrophysical Journal, 788, 47 (2014)

9. Fazeleh Khajenabi, *Mohsen Shadmehri*
Role of thermal conduction in an advective accretion with bipolar outflows
MNRAS, 436, 2666 (2013)

10. *Mohsen Shadmehri*, Asiyeh Yaghoobi, Mahdi Khajavi
Rayleigh-Taylor instability in an ionized medium
Astrophysics and Space Science, 347, 151 (2013)

11. Abbassi, Shahram; Nourbakhsh, Erfan; *Shadmehri, Mohsen*
Viscous Accretion of a Polytropic Self-gravitating Disk in the Presence of Wind
The Astrophysical Journal, 765, 96 (2013)

12. *Shadmehri, Mohsen*; Enayati, Zahra; Khajavi, Mahdi
Magnetized Kelvin-Helmholtz instability in the presence of a radiation field
Astrophysics and Space Science, 341, 369 (2012)

13. Nekrasov, Anatoly K.; *Shadmehri, Mohsen*
Streaming Cold Cosmic-Ray Back-reaction and Thermal Instabilities along the Background Magnetic Field
The Astrophysical Journal, 756, 77 (2012)

14. *Shadmehri, Mohsen*; Khajenabi, Fazeleh
Dynamical friction in a magnetized gas
MNRAS, 424, 919 (2012)

15. *Shadmehri, Mohsen*; Khajenabi, Fazeleh
On the gravitational stability of a galactic disc as a two-fluid system
MNRAS, 421, 841 (2012)

16. *Mohsen Shadmehri*
The role of Hall diffusion in the magnetically threaded thin accretion discs
Astrophysics and Space Science, 338, 151 (2012)

17. Mosallanezhad, A.; Abbassi, S.; *Shadmehri, M.*; Ghanbari, J.
Vertically self-gravitating ADAFs in the presence of toroidal magnetic field
Astrophysics and Space Science, 337, 703 (2012)

18. A. K. Nekrasov, *Mohsen Shadmehri*
Multicomponent theory of buoyancy instabilities in magnetized plasmas: the case of magnetic field parallel to gravity
Astrophysics and Space Science, 333, 477 (2011)

19. *Mohsen Shadmehri*, Bruce G. Elmegreen
Mass functions in fractal clouds: the role of cloud structure in the stellar initial mass function
MNRAS, 410, 788 (2011)

20. A.K. Nekrasov, *Mohsen Shadmehri*
Multicomponent Theory of Buoyancy Instabilities in Astrophysical Plasma Objects: The Case of Magnetic Field Perpendicular to Gravity
The Astrophysical Journal, 724, 1165 (2010)

21. *Shadmehri, Mohsen*; Rammos, Perikles
Kelvin-Helmholtz instability at the interface of a disc-corona system
MNRAS, 406, 2627 (2010)

22. Dib, Sami; *Shadmehri, Mohsen*; Padoan, Paolo; Maheswar, G.; Ojha, D. K.; Khajenabi, Fazeleh
The IMF of stellar clusters: effects of accretion and feedback
MNRAS, 405, 401 (2010)

23. *Shadmehri, Mohsen*; Nejad-Asghar, Mohsen; Khesali, Alireza
Thermal instability in ionized plasma
Astrophysics and Space Science, 326, 83 (2010)

24. *Mohsen Shadmehri*
Thermal instability and the effects of cosmic-ray diffusion
MNRAS, 397, 1521 (2009)

25. *Mohsen Shadmehri*, Sami Dib
Magnetothermal condensation modes including the effects of charged dust particles
MNRAS, 395, 985 (2009)

26. *Mohsen Shadmehri*

The influence of winds on the time-dependent behaviour of self-gravitating accretion discs
MNRAS, 395, 877 (2009)

27. *Mohsen Shadmehri*
Hot accretion with outflow and thermal conduction
Astrophysics and Space Science, 317, 201 (2009)

28. *Mohsen Shadmehri* & Turlough P. Downes
The role of Kelvin-Helmholtz instability in dusty and partially ionized outflows
MNRAS, 387, 1318 (2008)

29. Fazeleh Khajenabi, *Mohsen Shadmehri* & Sami Dib

Thin accretion disc with a corona in a central magnetic field
Astrophysics & Space Science, 314, 251 (2008)

30. *Mohsen Shadmehri*

Dynamics of charged dust particles in protoplanetary discs
Astrophysics & Space Science, 314, 217 (2008)

31. *Mohsen Shadmehri* & Turlough P. Downes

Kelvin-Helmholtz instability in a weakly ionized layer
Astrophysics & Space Science, 312, 79 (2007)

32. Sami Dib, Jongsoo Kim & *Mohsen Shadmehri*

The Origin of the Arches Stellar Cluster Mass Function
MNRAS Letters, 381, L40 (2007)

33. Gilberto C. Gomez, Enrique Vazquez-Semadeni, *Mohsen Shadmehri* & Javier Ballesteros-Paredes

Formation and Collapse of Quiescent Cloud Cores Induced by Dynamic Compressions
The Astrophysical Journal, 669, 1042 (2007)

34. Fazeleh Khajenabei & *Mohsen Shadmehri*

Gravitational instability of discs with dissipative coronae around supermassive black holes
MNRAS, 377, 1689 (2007)

35.Sami Dib, Jongsoo Kim, Enrique Vazquez-Semadeni, Andreas Burkert, *Mohsen Shadmehri* & Javier Ballesteros-Paredes

The Virial Balance of Clumps and Cores in Molecular Clouds
The Astrophysical Journal, 661, 262 (2007)

36.Mohsen Shadmehri & Fazeleh Khajenabei

A class of self-gravitating, magnetized accretion disks
The Astrophysical Journal, 637, 439 (2006)

37. Jamshid Ghanbari, *Mohsen Shadmehri* & Fatemeh Salehi

Non-linear theory of a warped accretion disc with the beta-viscosity prescription
Bull. Astr. Soc. India (BASI), 33, 447 (2005)

38. *Mohsen Shadmehri* & Fazeleh Khajenabei

Self-similar structure of magnetized, radiation-dominated accretion disks
MNRAS, 361, 719 (2005)

39. *Mohsen Shadmehri*

Gravitational collapse of polytropic, magnetized, filamentary clouds
MNRAS, 356, 1429 (2005)

40. Enrique Vazquez-Semadeni, Jongsoo Kim, *Mohsen Shadmehri*, & Javier Ballesteros-Paredes

The Lifetimes and Evolution of Molecular Cloud Cores
The Astrophysical Journal, 618, 344 (2005)

41.Mohsen Shadmehri

Variability in the stellar initial mass function at high mass: coalescence models for starburst clusters
MNRAS, 354, 375 (2004)

42. *Mohsen Shadmehri*

Time-dependent evolution of quasi-spherical, self-gravitating accretion flow
The Astrophysical Journal, 612, 1000 (2004)

43. *Mohsen Shadmehri*

A Model for Quasi-Spherical Magnetized Accretion Flow
Astronomy & Astrophysics, 424, 379 (2004)

44. Bruce Elmegreen & *Mohsen Shadmehri*

Constraints on Star Formation from the Close Packing of Protostars in Clusters
MNRAS, 338, 817 (2003)

45. *Mohsen Shadmehri* & Jamshid Ghanbari

Cooling Flows Of Self-Gravitating, Rotating, Viscous Systems
The Astrophysical Journal, 574, 198 (2002)

46. *Mohsen Shadmehri* & Jamshid Ghanbari

Radiative Cooling Flows Of Self-Gravitating Filamentary Clouds
Astrophysics & space science, 278, 347 (2001)

47. *Mohsen Shadmehri* & Jamshid Ghanbari

Self-Similar Equilibria Of Self-Gravitating, Magnetized, Rotating, Isothermal Systems
The Astrophysical Journal, 557, 1028 (2001)

48. Jamshid Ghanbari & *Mohsen Shadmehri*

Thermal Instability In The Interstellar Medium

Iranian Journal of Physics (IJP), v.2, n.3 (2000)

49. Jamshid Ghanbari & *Mohsen Shadmehri*

Structure And Evolution Of Massive Stars

Iranian Journal of Physics (IJP), (1997)

Papers in conference proceedings (incomplete):

Mohsen Shadmehri, Enrique Vazquez-Semadeni & Javier Ballesteros-Paredes

Virial theorem analysis of 3D numerical simulations of MHD self-gravitating turbulence, "Seeing Through the Dust: The Detection of HI and the Exploration of the ISM in Galaxies", ASP Conference Proceedings, Vol. 276. Edited by A. R. Taylor, T. L. Landecker, and A. G. Willis. ISBN: 1-58381-118-4. San Francisco: Astronomical Society of the Pacific, 2002., p.190

Enrique Vazquez-Semadeni, Jongsoo Kim, *Mohsen Shadmehri*, & Javier Ballesteros-Paredes

The Lifetimes of Molecular Cloud Cores: What is the Role of the Magnetic fields?

"Gravitational Collapse: From Massive stars to Planets", A meeting to celebrate Peter Bodenheimer for his outstanding contributions to Astrophysics. (Eds. G. García-Segura, G. Tenorio-Tagle, J. Franco, & H. W. Yorke) Revista Mexicana de Astronomía y Astrofísica (Serie de Conferencias) Vol. 22, pp. 22-25

Sami Dib, Enrique Vazquez-Semadeni, Jongsoo Kim, Andreas Burkert & *Mohsen Shadmehri*

The virial balance of clumps and cores in molecular clouds

Triggered Star Formation in a Turbulent ISM, Edited by B. G. Elmegreen and J. Palous. Proceedings of the International Astronomical Union 2, IAU Symposium #237, held 14-18 August, 2006 in Prague, Czech Republic. Cambridge: Cambridge University Press, 2007., pp.410-410

Sami Dib, *Mohsen Shadmehri*, Maheswar Gopinathan, Jongsoo Kim, Thomas Henning

Primordial Mass Segregation in Starburst Stellar Clusters

to be published in the proceedings of the meeting "Massive Star Formation: Observations confront Theory". ASP Conf. Series

(astro-ph>arXiv:0710.3969)