

# Hossein Moshafi

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in [/hossein-moshafi](#)

## ✔ Current Appointment

- » PostDoctoral Researcher September 2020–Present
  - > School of Astronomy, Institute for Research in Fundamental Sciences (IPM) Tehran, Iran
- » Non Resident Researcher November 2019–September 2020
  - > School of Physics, Institute for Research in Fundamental Sciences (IPM) Tehran, Iran
- » Researcher October 2017–September 2020
  - > Ibn-Sina Laboratory, Department of Physics, Shahid Beheshti University Tehran, Iran

## 🎓 Education

- » Ph.D. in Physics, Cosmology Sep 2011 –May 2017
  - > Institute for Advanced Studies in Basic Sciences (IASBS) Zanjan, Iran
- » M.Sc. in Physics, Cosmology 2008 – 2011
  - > Shahid Beheshti University (SBU) Tehran, Iran
- » B.Sc. in Physics 2004 – 2008
  - > Sharif University of Technology (SUT) Tehran, Iran

## 📅 Current Projects

- » "Cosmological Constant problem and  $H_0$  tension" in collaboration with Hassan Firouzjahi (IPM)
- » "The  $\sigma_8$  tension as a hint of non-local gravity" in collaboration with Shant Baghran (Sharif University of Technology)
- » "Growth Geometry parameter splitting in interacting Dark Energy" in collaboration with Nima Khosravi (Shahid Beheshti University)
- » "Hubble tension in Bianchi type-I Universe with Modified Emergent Dark Energy Model" in collaboration with Hachemi Benoum (University of Sharjah)
- » "Warm Inflation and Trans-Planckian censorship conjecture" in collaboration with Vahid Kamali (McGill University)
- » "Non-Gaussianity and gravitational wave background" in collaboration with Hassan Firouzjahi (IPM)
- » "Standard Clocks in the light of new observations" in collaboration with Mohammad Hossein Namjoo (IPM)
- » "Anomaly detection in CMB maps by using Machine Learning algorithms" in collaboration with Mohammad Hossein Namjoo (IPM)

## 📄 Publications

- » **H. Moshafi**, S. Baghran, N. Khosravi, "CMB lensing in a modified  $\Lambda$ CDM model in light of the  $H_0$  tension", Phys. Rev. D 104, 063506 (2021)

- » V. Kamali, **H. Moshafi**, S. Ebrahimi, "Minimal Warm Inflation and TCC", arXiv:2111.11436 [gr-qc]
- » H. Sheikahmadi, T. Harko, **H. Moshafi**, "Observational constraints on an Irreversible open Thermodynamic system, seeking to cure Hubble tension", in preparation
- » Z. Safari, B. Malekolkalami, **H. Moshafi**, "Cosmological constraints on dark matter particle production rate", arXiv:2004.02446 [gr-qc]
- » B. Mostaghel, **H. Moshafi**, S.M.S. Movahed, "The Integrated Sachs-Wolfe Effect in the Bulk-Viscous Dark Energy model", arXiv:1810.04856[astro-ph.CO], Monthly Notices of the Royal Astronomical Society, Volume 481, Issue 2, 1 December 2018.
- » B. Mostaghel, **H. Moshafi**, S.M.S. Movahed, "Non-minimal Derivative Coupling Scalar Field as a Bulk-Viscous Dark Energy", arXiv:1611.08196 [astro-ph.CO], Eur. Phys. J. C 77, no. 8, 541 (2017)
- » N. Mirzatanuy, S. Khosravi, S. Baghran, & **H. Moshafi**, "Simultaneous effect of Modified Gravity and Primordial Non-Gaussianity in Large Scale Structure Observations
- » **H. Moshafi**, M. Bahraminasr, "A Guide for CosmoMC Installation and Running", arXiv:1808.05080 [astro-ph.IM]
- » A. S. Ebrahimi, **H. Moshafi**, "Are Cold Dynamical Dark Energy Models Distinguishable in the Light of the Data?", arXiv:1802.05087 [astro-ph.CO]

## Conference Papers

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- » B. Mostaghel, **H. Moshafi**, S.M.S. Movahed, "Viscous Dark Energy: A Proposal to Resolve the Tension Between Planck and Redshift Space Distortion", National Physics Conference, Iran, Summer 2017.
- » B. Mostaghel, **H. Moshafi**, S.M.S. Movahed, "Footprints of Interaction of Viscous Dark Energy and Dark Matter on the Expansion History of the Universe", National Conference of Gravitation and Cosmology, Winter 2016, SBU, Iran.
- » **H. Moshafi**, A. Vafaei Sadr, S.M.S. Movahed, H. Haghi, "Two-point correlation function of Peaks in Planck data: Hemispherical Asymmetry", National Conference of Gravitation and Cosmology, Winter 2015, SUT, Iran.
- » **H. Moshafi**, S.M.S. Movahed, M. Zarei, "Search for local kink in the CMB power spectrum", poster presentation in Summer School on Cosmology at ICTP, Summer 2012, Trieste, Italy.
- » **H. Moshafi**, M. Zarei, & M. Sadegh Movahed, "Local features in CMB power spectrum", National Conference of Gravitation and Cosmology, Winter 2013, Iran.
- » M. Sadegh Movahed, B. Javanmardi, & **H. Moshafi**, "Cosmic string detection using peak - peak correlation function in CMB map", National Physics Conference, Iran, Summer 2011.
- » M. Sadegh Movahed, B. Javanmardi, & **H. Moshafi**, "Two-point correlation function of peaks in the cosmic microwave background radiation", 15<sup>th</sup> meeting on Research Astronomy, Zanjan, Iran, 2011.
- » **H. Moshafi**, M. Sadegh Movahed, & A. Sojasi, "Statistical Properties of Deviation of Inflaton from Quantum Thermal Vacuum", National Conference of Gravitation and Cosmology, Winter 2011, Iran.
- » **H. Moshafi** & M. Sadegh Movahed, "Footprint of Power-law Quintessence model on the Last Scattering Surface fluctuations, Large Scale Structure formation and evolution of the Universe", National Physics Conference, Iran, Summer 2010.

- » **H. Moshafi** & M. Sadegh Movahed, "The Power Spectrum of CMB Radiation in the Power Law Model of Dark Energy", National Conference of Gravitation and Cosmology, Winter 2010, Iran.

## Research Interests

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- ➔ Observational Cosmology
- ➔ Cosmological Structure Formation
- ➔ Dark Energy & Modified Gravity
- ➔ Inflation and Early Universe
- ➔ Reionization & 21cm fluctuations
- ➔ Data Modeling, Data Science, Machine Learning

## Academic Experiences

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### ➔ Student Supervision

- » Advisor Feb. 2015 – Nov. 2018
  - > Ph.D. Student Shahid Beheshti University
  - » Behrang Mostaghel, "Correspondence Between Dynamical Dark Energy and Bulk Viscous Cosmology",  
Primary supervisor: Dr. S.M.S. Movahed.
- » Advisor Mar. 2012– Mar. 2014
  - > M.Sc. Student University of Zanjan
  - » Fatemeh Fehrest, "CMB power spectrum and parameter estimation using artificial neural networks",  
Primary supervisor: Dr. Mehdi Bazarghan

### ➔ Research Experience

- » Research Assistant:
  - > Institute for Advanced Studies in Basic Sciences, Under the supervision of Dr. Haghi 2011– 2014
  - > Shahid Beheshti University, Under the supervision of Dr. Movahed 2008– 2011

### ➔ Teaching Experience

- » Instructor
  - > "Advanced Cosmology" for graduate students, Amirkabir University of Technology Winter 2020
  - > "Astrophysics" for graduate students, Sufi University Winter 2014
  - > "Galactic Dynamics", National Astronomy Olympiad Team 2012– 2013
- » Teaching Assistant
  - > "Astrophysics II" , for graduate students , Institute for Advanced Studies in Basic Sciences 2012
  - > "Thermodynamics", for graduate students Shahid Beheshti University 2009
  - > "Fundamentals of Physics", Shahid Beheshti University 2010

## 🔗 Scientific Administrative Experience

### » Local Organization

- > 17<sup>th</sup> Meeting on Research in Astronomy, Institute for Advanced Studies in Basic Sciences Spring 2013
- > 16<sup>th</sup> Meeting on Research in Astronomy, Institute for Advanced Studies in Basic Sciences Spring 2012
- > 17<sup>th</sup> Physics students meeting, Physics Society of Iran Summer 2009

### » Scientific Organization

- > National Astronomy and Astrophysics Olympiad, National Astronomy Olympiad Team 2009 – 2011
- > 18<sup>th</sup> Annual of high school students conference of Physics Summer 2010

### » Editor in Chief

- > Science Today (Online Scientific Magazine) 2016 – Present
- > Takaneh Magazine (Scientific Magazine of Physics at Sharif University of Technology) 2006 – 2007

## ⚙️ Computer Skills

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### 🔗 Operating System

- » GNU/Linux, MacOS, Windows

### 🔗 Programming Language

- » Python2&3, Fortran 90, C/C++, SQL

### 🔗 Tools

- » Bash Scripting, Gnu Core Utilities, Git

### 🔗 Libraries & APIs

- » Numpy, SciPy, Matplotlib, Pandas, Seaborn, AstroPy, OpenMP, GetDist

### 🔗 Scientific Packages

- » CosmoMC, CAMB, GADGET-2, Enzo, Mone Python, CLASS, HEALPix, GLESP, Zeno, xAct

### 🔗 Software

- » Wolfram Mathematica, Maple, MATLAB/Octave, Gnuplot

### 🔗 General

- » L<sup>A</sup>T<sub>E</sub>X, LibreOffice, iWork, MS office, Adobe Photoshop, Adobe InDesign, WordPress

### 🔗 Repositories

- » GitHub Repository :  /moshafi

## ☰ Other Skills

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### 🔗 Data Analysis

» General Analytics, Reporting, Predictive Modeling, Machine Learning, Visualization, Bayesian Model Diagnostics, Bayesian Model Selection, MCMC

## Languages

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- ➔ Persian > Native
- ➔ English > Fluent

## Selected Workshops & Conferences

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### ➔ Workshop

#### » Lecturer

- > Observational Data Analysis with "CosmoMC", Iran Space Agency, Fall 2021 IRAN
- > Introduction to Python for Physicists, University of Kurdistan, Summer 2021 IRAN
- > Bayesian Data Analysis with "CosmoMC", University of Kurdistan, Winter 2020 IRAN
- > Cosmological Data Analysis with "CosmoMC", University of Neyshabur, Fall 2019 IRAN
- > Introduction to Cosmological Codes, Shahid Beheshti University, Spring 2018 IRAN
- > Introduction to CosmoMC, Sharif University of Technology, Winter 2018 IRAN
- > National conference of Gravitation and Cosmology (NGC), Sharif University of Technology, 2015 IRAN

#### » Attendance

- > Origin of Cosmic Structures: Numerical and Theoretical Approach, IHP, 2013 FRANCE
- > Workshop on Large Scale Structure, ICTP, 2012 ITALY
- > 4<sup>th</sup> Workshop on High Performance and Grid Computing (HPC4), IPM, 2012 IRAN

### ➔ School

#### » Lecturer

- > Tehran meeting on "Cosmology at the Crossroads", Shahid Beheshti University, Winter 2021 IRAN

#### » Attendance

- > "Tehran meeting on Modified Gravity", IPM, 2016 IRAN
- > Summer School on Cosmology", ICTP, 2016 ITALY
- > School of "Advanced Cosmology", Shahid Beheshti University, 2013 IRAN
- > School of "N-body Gravitational Dynamical Systems", IHP, 2013 FRANCE
- > 20<sup>th</sup> Spring School of Physics, IPM, 2013 IRAN
- > Summer School on Cosmology, ICTP, 2013 ITALY

### ➔ Conference

#### » Attendance

- > National conference of Gravitation and Cosmology (NGC), Shahid Beheshti University, 2013 IRAN
- > National conference of Gravitation and Cosmology (NGC), Tehran University, 2013 IRAN
- > National conference of Gravitation and Cosmology (NGC), Sharif University of Technology, 2011 IRAN
- > National conference of Physics, Bu Ali Sina University, 2010 IRAN
- > National conference of Gravitation and Cosmology (NGC), Shahid Beheshti University, 2010 IRAN

## Personal Info

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- ➔ Sex > Male
- ➔ Date of Birth > 1986-07-15
- ➔ Nationality > Iranian

#### References

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- » Dr. Hassan Firouzjahi:  [firouz@ipm.ir](mailto:firouz@ipm.ir)
  - > Full Professor of Physics, School of Astronomy, Institute for Research in Fundamental Science (IPM)
  
- » Dr. Shant Baghram:  [baghram@sharif.edu](mailto:baghram@sharif.edu)
  - > Associate Professor of Physics, Dept. of Physics Sharif University of Technology
  
- » Dr. Seyed Mohammad Sadegh Movahed:  [m.s.movahed@ipm.ir](mailto:m.s.movahed@ipm.ir)
  - > Associate Professor of Physics, Dept. of Physics Shahid Beheshti University
  
- » Dr. Nima Khosravi:  [n-khosravi@sbu.ac.ir](mailto:n-khosravi@sbu.ac.ir)
  - > Associate Professor of Physics, Dept. of Physics Shahid Behshti University