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# MEYSAM MOTAHARFAR

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## RESEARCH INTEREST

### Physics of Very Early Universe

- Inflationary cosmology and its alternatives
- Theory of cosmological perturbations and non-Gaussianity
- Post-inflationary physics, reheating and particles production
- Application of modified gravity theories and M/superstring theory in the very early universe

### Approaches to dark matter and dark energy

- particle dark matter and its alternatives
- Modified gravity approach to cosmic acceleration
- connecting darkmatter/energy to very early universe cosmology

### Observational cosmology

## EDUCATION

### Louisiana State University, Baton Rouge, LA, USA

*PhD in Physics*

08/2021-present

- GPA: 4.00/4.00

- Supervisor: *Prof. Parampreet Singh*

### Shahid Beheshti University, Tehran, Iran

*Master of Science, Gravitation and cosmology*

09/2013-01/2016

- GPA of the last year: 17.68/20

- Thesis:  $f(R)$  cosmic inflation in Palatini formalism (point: 19/20)

- Supervisor: *Prof. Hamid Reza Sepangi*

- Synopsis: Reviewing the dynamics of  $f(R)$  cosmic inflation (generally scalar-tensor theories) in the Palatini formalism, we comprehensively investigated its perturbed field equations utilizing cosmological perturbations theory and obtained inflationary observable quantities. Then, we considered different inflationary models in the context of modified gravity and confronted them with observational data.

### Semnan university, Semnan, Iran

*Bachelor of Science, Physics*

10/2009-07/2013

- Cumulative GPA: 15.06/20

## NOTABLE COURSE

**Advanced Quantum Mechanic I & II** (Textbook: Modern Quantum Mechanics-J. J. Sakurai)  
**General Relativity and Gravitation I & II** (Textbook: Introducing Einstein's Relativity- D'Inverno)

**Advanced Cosmology** (Textbook: Physical Foundations of Cosmology - Viatcheslav Mukhanov)

**Special Relativity** (Textbook: Introduction to special relativity - Hosein Ghafarnejad)

**Advanced Statistical Mechanics** (Textbooks: statistical Mechanic - R. K. Pathria, and Thermodynamics and Statistical Mechanics - Walter Greiner)

**Computational Physics** (Programming language: FORTRAN and introductory to Python)

**Quantum Field theory I** (Textbook: Introduction to Quantum field Theory- Michael E. Peskin and Quantum Field Theory- Lweis H. Ryder)

## COMPUTER SKILLS

**Intermediate:** Fortran, Mathematica,  $\LaTeX$ , Linux, Office

**Beginner:** GRtensor Package, CosmoMC Code, maple

LANGUAGE	Persian (Native), English (Fluent, TOEFL:102)
TEST SCORES	<b>GRE General:</b> Quantitative: 165/ Verbal: 150/ Analytical Writing: 3.5 <b>GRE Physics:</b> 800
TEACHING EXPERIENCE	Trainer assistant of Electromagnetism II (Instructor: Associate Prof. <a href="#">A. Hosseini</a> , Textbook: Introduction to Electrodynamics - David J. Griffiths, B.Sc. Students)
CONFERENCES & SCHOOL ATTENDANCE	<p><b>Gravitation National Seminar</b>, Department of Physics, Isfahan University of Technology (2018)</p> <p><b>Tehran meeting on cosmology</b>, School of Physics, Institute for Research in Fundamental Sciences (2017)</p> <p><b>Tehran meeting on modified gravity</b>, School of Physics, Institute for Research in Fundamental Sciences (2016)</p> <p><b>School of Gravitation &amp; Cosmology</b>, Department of Physics, Shahid beheshti University (2014)</p>
PUBLICATIONS	<p>10- <a href="#">M. Motaharfar</a>* and <a href="#">R. O. Ramos</a>, “Dirac-Born-Infeld warm inflation realization in the strong dissipation regime”, published in <i>Physical. Review. D</i> [doi: <a href="#">10.1103/PhysRevD.104.043522</a>]</p> <p>9- <a href="#">M. Motaharfar</a>* and <a href="#">P. Singh</a> “Role of dissipative effects in the quantum gravitational onset of warm Starobinsky inflation in a closed universe”, published in <i>Physical. Review. D</i> [doi: <a href="#">10.1103/PhysRevD.104.106006</a>]</p> <p>8- <a href="#">V. Kamali</a>, <a href="#">M. Motaharfar</a> and <a href="#">R. O. Ramos</a>, “Warm brane inflation with an exponential potential: a consistent realization away from the swampland”, published in <i>Physical. Review. D</i> [<a href="#">10.1103/PhysRevD.101.023535</a>].</p> <p>7- <a href="#">M. Motaharfar</a>*, <a href="#">V. Kamali</a> and <a href="#">R. O. Ramos</a>, “Warm inflation as a way out of the Swampland”, published in <i>Physical. Review. D</i> [doi:<a href="#">10.1103/PhysRevD.99.063513</a>].</p> <p>6- M. Butler, A. M. Ghezelbash, E. Massaeli and <a href="#">M. Motaharfar</a>, “Atiyah-Hitchin in Five Dimensional Einstein-Gauss-Bonnet Gravity”, published in <i>Mod. Phys. Lett. A</i> [doi:<a href="#">10.1142/S0217732319502328</a>].</p> <p>5- <a href="#">M. Motaharfar</a>*, E. Massaeli and <a href="#">H. R. Sepangi</a>, “Warm Higgs G-inflation: predictions and constraints from Planck 2015 likelihood,” published in <i>Journal of Cosmology and Astroparticle Physics (JCAP)</i> [doi:<a href="#">10.1088/1475-7516/2018/10/002</a>].</p> <p>4- <a href="#">M. Motaharfar</a>*, E. Massaeli and <a href="#">H. R. Sepangi</a>, “Power spectra in warm G-inflation and its consistency: stochastic approach,” published in <i>Physical. Review. D</i> [doi:<a href="#">10.1103/PhysRevD.96.103541</a>].</p> <p>3- <a href="#">V. Kamali</a>, S. Basilakos, A. Mehrabi, <a href="#">M. Motaharfar</a> and E. Massaeli, “Tachyon warm inflation with the effects of loop quantum cosmology in the light of Planck 2015 data,” published in <i>International journal of Modern Physics D</i> [doi:<a href="#">10.1142/S0218271818500566</a>].</p> <p>2-E. Massaeli, <a href="#">M. Motaharfar</a> and <a href="#">H. R. Sepangi</a>, “General scalar-tensor cosmology: Analytical solutions via Noether symmetry,” published in <i>European. Physical. Journal. C</i> [doi:<a href="#">10.1140/epjc/s10052-017-4682-3</a>].</p> <p>1- <a href="#">M. Motaharfar</a>* and <a href="#">H. R. Sepangi</a>, “Warm-tachyon Gauss-Bonnet inflation in the light of Planck 2015 data,” published in <i>European. Physical. Journal. C</i> [doi:<a href="#">10.1140/epjc/s10052-016-4474-1</a>].</p>

- *First author publications marked by ★*

ACTIVITIES &  
INTERESTS

Mountaineering, Jogging, Reading novels, Painting, Traveling, Cooking, Watching movies

REFERENCES

**Prof. Hamid Reza Sepangi**, Physics department, Shahid Beheshti university

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**Prof. Rudnei O. Ramos**, Physics deartment, Rio de Janeiro State University

*Email:* [rudnei@uerj.br](mailto:rudnei@uerj.br)

**Dr. Vahid Kamali**, School of Physics, *Institute for Research in Fundamental Sciences*

*Email:* [vkamali@ipm.ir](mailto:vkamali@ipm.ir)