Mahmoud Wahba Hashim

CONTACT INFORMATION

Department of Physics and Astronomy
University of the Western Cape
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EDUCATION

University of the Western Cape

Ph.D., Physics and Astronomy Department, expected March 2016

- Thesis Topic: *Imprints of Primordial Non-Gaussianity on Large Scale Structure in the Universe.*
- Adviser: Professor Roy Maartens

African Institute for Mathematical Sciences

Postgraduate Diploma (PGD)., African Institute for Mathematical Sciences (AIMS), June 2012

- Research Project Topic: *Consistency Relations and Non-Gaussianity in Inflation.*
- Adviser: Doctor Navin Sivanandam
- Project Mark: Distinction
- Diploma Mark: Good Pass (70%)

Cairo University

M.Sc., Physics Department, Faculty of Science, Feb 2011

- Thesis Topic: *Bulk and Shear Viscosity in the Early Universe Cosmology.*
- Adviser: Professor Hesham Mansour

Benha University

B.Sc., Faculty of Science, June 2005

- Major: Physics
- Essay Title: Cosmic Rays.
- Essay Mark: Excellent
- GPA: 71.45 %

REFEREED JOURNAL PUBLICATIONS

[1] **M. Hashim**, D. Bertacca and R. Maartens, "Degeneracy between primordial non-Gaussianity and interaction in the dark sector," *Phys. Rev. D* **90**, **10**, 103518 (2014) [arXiv:1409.4933 [astro-ph.CO]], doi:10.1103/PhysRevD.90.103518.

[2] A. Tawfik, **M. Wahba**, H. Mansour and T. Harko,"Viscous Quark-Gluon Plasma in the Early Universe," *Annalen Phys.* **523**, 194 (2011) [arXiv:1001.2814 [gr-qc]], doi:10.1002/andp.201000052.

[3] A. Tawfik and **M. Wahba**,"Bulk and Shear Viscosity in Hagedorn Fluid," *Annalen Phys.* **522**, 849 (2010) [arXiv:1005.3946 [hep-ph]], doi:10.1002/andp.201000056.

[4] A. Tawfik, **M. Wahba**, H. Mansour and T. Harko,"Hubble Parameter in QCD Universe for finite Bulk Viscosity," *Annalen Phys.* **522**, 912 (2010) [arXiv:1008.0971 [gr-qc]], doi:10.1002/andp.201000103.

Conference Publications

[5] A. Tawfik, **M. Wahba**, H. Mansour and T. Harko,"Dissipative Processes in the Early Universe: Bulk Viscosity," *Uzbek J. Phys.* **12**, 316 (2010) *Proceedings of the* 7^{th} *international conference on "Modern Problems of Nuclear Physics", 22-25 Sep 2009. Tashkent, Uzbekistan* (2009). [arXiv:0911.4105 [gr-qc]],

[6] A. Tawfik, **M. Wahba** and H. Mansour,"Hubble Parameter in Bulk Viscous Cosmology," *Proceedings of the* 12^{th} *Marcel Grossmann Meeting on General Relativity (MG 12), 12-18 Jul 2009. Paris, France*, p.1385-1387 (2009). [arXiv:0912.0115 [gr-qc]],
doi:10.1142/9789814374552_0223.

MSc Thesis

[7] **M. Hashim**, "Bulk and Shear Viscosity in the Early Universe Cosmology", *LAP Lambert Academic Publishing GmbH & Co., Saarbrucken, Germany.* ISBN-10: 3846504556 (2011),
Thesis on Amazon.

Talks

[8] **M. Hashim**, "Simulating the Interaction between Dark Energyand Dark Matter," *SKA Postgraduate Bursary Conference,* **Stellenbosch, South Africa***, 30 November - 4 December, 2015* .

[9] **M. Hashim**, "Degeneracy between primordial non-Gaussianity and interaction in the dark sector," *Fundamental Issues of the Standard Cosmological Model,* **Cargese (Corsica), France***, 22-26 September, 2014.*

[10] **M. Hashim**, "Probing Primordial non-Gaussianity with SKA Galaxy Surveys," *SKA Postgraduate Bursary Conference,* **Stellenbosch, South Africa***, 25 - 29 November, 2013.*

Conferences attended

- SKA Postgraduate Bursary Conference, **Stellenbosch, South Africa**, 30 November - 4 December, 2015.
- ISAPP 2015 School on Cosmology, **Paris, France**, 15-25 June, 2015.
- Fundamental Issues of the Standard Cosmological Model, **Cargese (Corsica), France**, 22-26 September, 2014.
- XII^{th} School of Cosmology: Structure Formation after Planck, **Cargese (Corsica), France**, 15 - 20 September, 2014.
- SKA Postgraduate Bursary Conference, **Stellenbosch, South Africa**, 25 - 29 November, 2013.
- Workshop on Galaxy Bias: Non-linear, Non-local and Non-Gaussian, **Trieste, Italy**, 8 - 11 October, 2013.
- Workshop on Promoting Gravitational Wave Astronomy in Africa, **Johannesburg, South Africa**, 31 May - 1 June, 2012.
- Spring School in Superstring theory and related topics, **ICTP, Trieste, Italy**, 28 Mar - 5 April, 2011.
- Summer School in Cosmology, **ICTP, Trieste, Italy**, 19 - 30 July, 2010.
- Egyptian School in High Energy Physics, **Cairo, Egypt**, 27 May - 4 June, 2009.
- The 4^{th} International workshop on the Dark Side of the Universe, **Cairo, Egypt**, 1 - 5 June, 2008.

Awards and Scholarships

University of the Western Cape
- SKA (Square Kilometre Array) bursary for PhD studies UWC, 2013– 2016.

African Institute for Mathematical Sciences
- Full bursary for postgraduate diploma at AIMS, 2011 – 2012.

Cairo University
- Best Masters thesis award, 2012.

MTI University
- Full bursary for Masters studies at the Egyptian Center for Theoretical Physics, 2008 – 2010.

Codes developed

- **CosmoSuite:** github.com/mwhashim/CosmoSuite
  Python developed GUI toolkit for running and analysing general cosmological perturbations and cosmological N−Body simulation. The code is based mainly on CAMB, N−GenIC, 2LPT_PNGnonlocal for initial conditions, Gadget 2 for N−body simulation and AHF for Halo and SubHalos finder.

- **CDEPNGpy:** github.com/mwhashim/CDEPNGpy
  Python code developed to solve coupled dark energy perturbation system and investigate degeneracy with respect to primordial non−gaussianity. The results based on this code are published in Arxiv:1409.4933.

- **2LPT_PNG_CDE:** github.com/mwhashim/2LPT_PNG_CDE
  A modified version of the C code 2LPT_PNGnonlocal for generating initial conditions for coupled dark energy N−Body simulations.

Skills

- **Operating Systems:** Mac OSX, Linux (Ubuntu, Open Suse 11, Scientific Linux), Windows.
- **High Performance Computing:** Sciama Cluster (University of Portsmouth), PBS, MPI-Parallel computing (C, FORTRAN).
- **Coding Languages:** FORTRAN, Python, Mathematica, Sage, C, C++, GRTensor, LaTeX, html.
- **Codes and Programs:** CAMB, CLASS, GADGET 2, AHF, POWMES, HMFcal, FOF.
- **Languages:** Arabic (Mother-tongue), English (Fluent).

References Available to Contact

Prof. Roy Maartens (e-mail: roy.maartens@gmail.com)
- Professor, Physics and Astronomy department, University of the Western Cape & Institute of Cosmology and Gravitation, University of Portsmouth.
  - ◇ Physics and Astronomy department, University of the Western Cape, Private Bag X17, Belville 7535, South Africa.
  - ⋆ *Prof. Maartens is my PhD supervisor.*

Dr. Daniele Bertacca (e-mail: daniele.bertacca@gmail.com)
- Doctor, Argelander-Institut fr Astronomie (AIfA), University of Bonn.
  - ◇ Argelander-Institut fr Astronomie (AIfA), Department of Physics and Astronomy, University of Bonn, Germany.
  - ⋆ *Dr. Bertacca is my PhD co-supervisor.*

Dr. Marco Baldi (e-mail: marco.baldi5@unibo.it)
- Doctor, Department of Physics and Astronomy, Alma Mater University.
  - ◇ Department of Physics and Astronomy at the Alma Mater University, Bologna, Italy.

More Information

More information and auxiliary documents can be found at `http://mwhashim.github.io`.