Mahmoud Yousif Ali Wahba Hashim

Contact Information

Department of Physics and Astronomy
Alma Mater Studiorum - Universit di Bologna
Via Piero Gobetti 93/3, Bologna 40129,
Italy

+39 340 7380043
mwhashim.github.io
github.com/mwhashim
mahmoud@aims.ac.za

Work Experience

Postdoctoral fellow at Centre for Theoretical Physics, British University in Egypt *1 Sept 2018 – 31 August 2020*

Post-doc at Physics and Astronomy department, Alma Mater Studiorum - Bologna University *1 Sept 2016 – 31 August 2018*

Education

- **Ph.D.** in *Physics* at University of the Western Cape, South Africa *7 April 2017*
  Thesis title: *"Imprints of Primordial Non-Gaussianity on Large Scale Structure in the Universe".* **Supervisor**: Prof. Roy Maartens
- **Pg.Dip.** in *Mathematical Sciences* at AIMS, South Africa *20 June 2012*
- **M.Sc.** in *Physics* at Cairo University, Egypt *7 February 2011*
  Thesis title: *"Bulk and Shear Viscosity in the Early Universe Cosmology."*
  Supervisors: Prof. Hesham Mansour
- **B.Sc.** in *Physics* at Benha University, Egypt *30 July 2005*

Refereed Journal Publications

[1] **M. Hashim**, C. Giocoli, M. Baldi, D. Bertacca, R. Maartens, "Cosmic Degeneracies III: Interacting Dark Energy with non-Gaussian initial conditions", *Mon. Not. Roy. Astron. Soc.* **481**, 2933 (2018), doi:10.1093/mnras/sty2450, [arXiv:1806.02356 [astro-ph.CO]],

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

[3] A. Tawfik, **M. Wahba**[1], H. Mansour, T. Harko,"Viscous Quark-Gluon Plasma in the Early Universe," *Annalen Phys.* **523**, 194 (2011), doi:10.1002/andp.201000052, [arXiv:1001.2814 [gr-qc]].

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

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

Conference Publications

[6] A. Tawfik, **M. Wahba**, H. Mansour, 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]].

[7] A. Tawfik, **M. Wahba**, 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), doi:10.1142/9789814374552_0223, [arXiv:0912.0115 [gr-qc]].

[1] Note: I used "*Wahba*" (as my family name) on my first publications, then I changed it to the last name "*Hashim*" according to passport. In Egypt family names are not used in official documents.

MSc Thesis

[8] **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.

PhD Thesis

[9] **M. Hashim**, "Imprints of primordial non-Gaussianity on Large Scale Structure in the Universe" (2017).

Talks

[10] **M. Hashim**, "Degeneracy between Interacting Dark Energy and Primordial non-Gaussianity", *UniVersum meeting,* **Bologna, Italy**, *11–13 April 2018.*

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

[12] **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.*

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

Academic visitor

- Oxford University, **Oxford, UK**. 15 May - 15 July, 2016.
- Portsmouth University, **Portsmouth, UK**. 1 June - 8 July, 2013.

Conferences attended

- Newton Exchange Final Meeting, **Cape Town, South Africa** 18–22 March 2019
- From Dark Energy to Bright Synergies, **Sesto, Italy** 23–27 July 2018
- Euclid consortium annual meeting, **Bonn, Germany** 11–14 June 2018
- UniVersum meeting, **Bologna, Italy** 11–13 April 2018
- Joint Euclid CosmoSim & WL SWG meeting, **Barcelona, Spain** 24–27 Oct 2017
- Square Kilometer Array postgraduate Conference, **Stellenbosch, South Africa** 30 Nov – 4 Dec, 2015
- ISAPP 2015 School on Cosmology, **Paris, France** 15–25 June, 2015
- Fundamental Issues of the Standard Cosmological Model, **Cargese (Corsica), France** 22–26 Sept, 2014
- XII$^{\text{th}}$ School of Cosmology: Structure Formation after Planck, **Cargese (Corsica), France** 15–20 Sept, 2014
- Square Kilometer Array postgraduate Conference, **Stellenbosch, South Africa** 25–29 Nov, 2013
- Workshop on Galaxy Bias: Non-linear, Non-local and Non-Gaussian, **Trieste, Italy** 8–11 Oct, 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

- Square Kilometer Array bursary for PhD studies. South Africa, 2013
- Best Masters thesis award from Cairo University. Egypt, 2012

Euclid Consortium	• Theory Science Working Group: WP-3&4 • Cosmological Simulation Science Working Group: WP-1&8
Teaching Experience	• **Practical Statistics for Physics and Astronomy** 19 Feb – 1 June 2018 **Role**: Teaching Assistant, **Class**: Physics and Astronomy post-grad Courses at Physics and Astronomy department, Bologna University. • **Physics A and B for Engineers** August 2014 – March 2016 **Role**: Teaching Assistant, **Class**: Physics and Engineering undergrad first year at Physics department, University for Cape Town.
Codes	• **CosmoSuite** Python GUI toolkit for running and analysing cosmological N−Body simulations. • **CDEPNGpy** Python code to calculate the linear halo power spectrum for coupled Dark Energy with Primordial non-Gaussianity. • **2LPT_PNG_CDE** A modified version of 2LPTic code to generate initial conditions for N−Body simulations of coupled Dark Energy with Primordial non-Gaussianity.
Codes Development	CAMB, CLASS, N-GenIC, 2LPTic, GADGET, AHF, FOF, SUBFIND, POWMES, P-POWER, HMFcal, VIDE.
Coding Languages	Python, C/C++, Fortran, IDL, HTML, HPC (pbs, slurm), LaTeX
Operating Systems	Mac OSX, Linux, Unix, Windows.
Languages	Arabic (Mother-tongue), English (Fluent), Italian (Basic).
Referees	• **Prof. Roy Maartens** SKA/SARChI Professor in Astronomy & Astrophysics, Physics Department, University of Western Cape, South Africa. **Email**: roy.maartens@gmail.com • **Dr. Marco Baldi** Junior assistant professor (fixed-term), Department of Physics and Astronomy, Bologna University, Italy. **Email**: marco.baldi5@unibo.it • **Prof. Robert Benton Metcalf** Senior assistant professor (fixed-term), Department of Physics and Astronomy, Bologna University, Italy. **Email**: robertbenton.metcalf@unibo.it • **Dr. Daniele Bertacca** Junior assistant professor (fixed-term), Department of Physics and Astronomy, Padova University, Italy. **Email**: daniele.bertacca@gmail.com • **Dr. Carlo Giocoli** Post-doctoral, FST - University of Ferrara OAS - INAF, Bologna, Italy. **Email**: cgiocoli@gmail.com