

## Biographical Sketch – Titus K Mathew

TITUS K MATHEW

Professor

Department of Physics

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### Research Interest

My research area is Gravitation and Cosmology. Cosmological observations show that the current Universe is accelerating, and reason could be the presence of an exotic cosmic component called dark energy. My group is trying to understand the nature and evolution of dark energy. We are also trying to explain the recent accelerated expansion of the Universe by using the dissipative process in the Universe, which in fact, does not need an exotic component to cause the acceleration. Another area in which we engage is to understand the nature of gravity. The intriguing connection between gravity and thermodynamics reveals that gravity could be an emergent phenomenon. Following this concept, we are trying to understand the expansion of the Universe by using the fundamental laws of thermodynamics, which may give ultimate answers to the problem of the cosmological constant and other related issues.

### EDUCATION

Ph.D in Physics	Cochin University of Science and Technology	1999
M.Sc (Physics)	Cochin University of Science and Technology	1986
B.Sc (Physics)	Kerala University	1984

### POSITIONS:

Professor	Cochin University of Science and Technology, India	09/2014 - onwards
Associate Professor	Cochin University of Science and Technology, India	09/2007 – 09/2014
Senior Lecturer	Various Govt. Colleges, Kerala State	12/1998 – 8/2007

### SERVICES ON PROFESSIONAL PANELS

- PhD examiner for M G University, Kottayam & IEST, Shibpur, Howrah, West Bengal.
- Reviewer of research articles (associate editor) to International Journals: Modern Physics Letters, International Journal of Modern Physics D, Canadian Journal of Physics.

- President, Academy of Physics Teachers, Kerala.

#### **Ph.D produced:**

1. Praseetha P - thesis title - "Studies on Holographic Ricci Dark Energy".)
2. Athira Sasidharan – thesis title - "Bulk viscous matter and recent acceleration of the Universe"
3. Rajagopalan Nair – thesis title - Studies on accelerating universe with bulk viscous Zeldovich fluid
4. Dintomon Joy -
5. Paxy George -

#### **VISITING POSITIONS & COLLABORATIONS:**

- Visiting Associate - Inter University Centre for Astronomy and Astrophysics, Pune, India
- Fermi National Accelerator Laboratory, USA - through Collaboration Indian Institutions and Fermi Lab for neutrino studies.

#### **SELECTED PROFESSIONAL ACTIVITIES**

- Coordinator of IUCAA Center for Astronomy Research and Development (ICARD), Department of Physics, Cochin University of Science and Technology, Kochi India.
- Coordinator of National Workshop on Recent Trends in Theoretical Physics", March, 2011, Department of Physics, Cochin University of Science and Technology, Kochi India.
- National workshop on Current trends in Applied Physics, April, 2014, at the Department of Physics, Cochin University of science and Technology, Kochi-22.
- Member of ISDT, TMT, Hawaii, USA
- Coordinator of the Workshop on Statistical Analysis in Cosmology, January 12-14, 2017, Department of Physics in association with IUCAA, Pune.
- Honorary Director, Centre of Particle Physics, Department of Physics, Cochin University of Science and Technology, Kochi.
- Regional Convener, Theoretical Physics Seminar Circuit Programme (TPSC), Department of Physics, Cochin University of Science and Technology, Kochi - a programme of DST, Govt of India.
- Coordinator of Workshop on "Emergent Gravity Paradigm", September 8-10, 2019, ICARD, Department of Physics, Cochin University of Science and Technology, Kochi India, in association with IUCAA Pune.

**PUBLICATIONS:** details at: <http://www-spires.fnal.gov/spires/>

#### **FEW SELECTED PUBLICATIONS:**

- ✓ N D Jerin Mohan, Krishna P B, Athira Sasidharan and **Titus K Mathew**, "Dynamical system analysis and thermal evolution of the causal dissipative model", **Class. Quant. Grav.** 37 (2020) no 7, 075007.
- ✓ Hareesh T, P B Krishna and **Titus K Mathew**, "First law of thermodynamics and Emergence of Cosmic Space in a Non-flat Universe", **Journal. Cosmo & Astro. Part. Phys.** (JCAP) 1912 (2019) no 12 024.

- ✓ Paxy George, M. Shereef and **Titus K Mathew**, "Interacting holographic Ricci dark energy as running vacuum", **Int. Nat. J. Mod. Phys.** 28 (2019) 1950060
- ✓ P. B. Krishna and **Titus K Mathew**, "Entropy maximization in the emergent gravity paradigm", **Phys. Rev. D** 99 (2019) N0.2 023535
- ✓ Mahith M, Krishna P B and **Titus K Mathew**, "Expansion law from first law of thermodynamics", **Journal. Cosmo & Astro. Part. Phys.** (JCAP) 12 (2018) 042.
- ✓ Rajagopalan K and **Titus K Mathew**, "A model of late universe with viscous Zel'dovich fluid and decaying vacuum", **Astrophys. And Space. Science** 363 (2018) 183.
- ✓ Athira Sasidharan, N D Jerin Mohan, Moncy V John and **Titus K Mathew**, "Bayesian analysis of bulk viscous matter dominated universe", **Eur. Phys. J. C** 78 (2018) 628
- ✓ N D Jerin Mohan, Athira Sasidharan and **Titus K Mathew**, "Bulk viscous matter and recent acceleration of the universe based on causal viscous theory", **Eur. Phys. J C** 77 (2017) 849
- ✓ Krishna P B and **Titus K Mathew**, "Holographic equipartition and the maximisation of entropy", **Phys. Rev. D** 96 (2017) 063513
- ✓ Rajagopalan Nair and **Titus K Mathew**, Bulk viscous Zel'dovich fluid model and its asymptotic behaviour, **Eur. Phys. J.C** 76, 519 (2016).
- ✓ Athira Sasidharan and **Titus K Mathew** "Phase space analysis of bulk viscous matter dominated universe". **JHEP** 06, 138(2016).
- ✓ *Paxy George and Titus K Mathew*, "Holographic Ricci dark energy as running vacuum, **Mod. Phys. Lett. A** 31, 1650075 (2016).
- ✓ **Titus K Mathew**, Chinthak Murali and Shejeelammal, "Evolution of non-interacting entropic dark energy and its phantom nature". **Mod. Phys. Lett. A** 31,1650071, (2016).
- ✓ *Athira Sasidharan and Titus K Mathew*., "Bulk viscous matter and recent acceleration of the Universe". **Eur. Phys. J C** 74, 3188 (2014)
- ✓ P Praseetha and **Titus K Mathew**, "Entropy of holographic dark energy and the generalized second law". **Class.Quant.Grav.** 31 (2014) 185012.
- ✓ **Titus K Mathew and P Praseetha**., "Holographic Ricci dark energy and generalized second law". **Mod.Phys.Lett. A** 29 (2014) 06, 1450023.
- ✓ P Praseetha and **Titus K Mathew**, "Interacting modified holographic Ricci dark energy model and statefinder diagnosis in flat universe", **Int.J.Mod.Phys. D** 23 (2014) 1450024.
- ✓ **Titus K Mathew**, Aiswarya R and Vidya K Soman, Cosmological horizon entropy and generalized second law for flat Friedmann universe, **Eur.Phys.J. C** 73 (2013) 619