Gravity in Focus

A one-day meeting in celebration of the career and contributions of Prof. Ghanashyam Date

Schedule

Friday 27/04/2018 in Alladi Ramakrishnan Hall

- **09:30 − 09:50**

  Title: **Understanding the Nature of Barbero-Immirzi Parameter with Ghanashyam Date**

  Speaker: **Romesh Kaul**

- **09:50 − 10:10**

  Title: **Keeping Up-Date with Shyam**

  Speaker: **MVN Murthy**

- **10:10 − 10:30**

  Title: **An exact derivation of Hawking effect in canonical formulation**

  Speaker: **Golam M Hossain**

  Abstract: Despite being one of the most extensively studied topics in modern physics, the study of Hawking effect itself remains relatively under-explored within the canonical quantization framework. In this talk, I shall discuss the key difficulties in realizing Hawking effect in canonical approach and a possible new way to overcome these hurdles.

- **10:30 - 10:50**

  Title: **Can bounces be a viable alternative to inflation?**

  Speaker: **L Sriramkumar**

- **10:50 - 11:10**   Tea/Coffee Break

- **11:10 −11:30**

  Title: **Neutron stars as laboratories to explore gravity**

  Speaker: **Manjari Bagchi**

- **11:30 −11:50**

  Title: **Classical defocussing of world lines in higher dimensional gravity**

  Speaker: **R Parthasarathy**

  Abstract: A five-dimensional gravity theory, motivated by the brane-w orld picture, with Kaluza scalar, is considered near the singularity (small scales where gra vity is strong) and is shown to give rise to a positive contribution t o the Raychaudhuri equation. This inhibits the focusing of geodesics and contributes to non - f ocusing of the geodesics. It is also shown that the results extend to time dependent cases such as those relevant for black hole interiors and cosmology.

- **11:50 − 12:10**

  Title: **Solitons and Non-Abelian Statistics**

  Speaker: **TR Govindarajan**

- **12:10 –12:30**

  Title: **Physical process law for black holes**

  Speaker: **Sudipta Sarkar**

  Abstract: The stationary comparison version of black hole first law is generally formulated in term of the variation of the ADM mass. On the other hand, the physical process version of the first law is a local formulation independent of the asymptotic structure of the space-time. In this talk, I will discuss the mathematical structure of the physical process law for both general relativity and beyond.

- **12:30 –12:50**

  Title: **The Gravitational Universe**

  Speaker: **KG Arun**

- **12:50 –14:10**   Lunch Break

- **14:10-14:30**

  Title: **'Time machine' spacetimes in vacuum gravity**

  Speaker: **Sandipan Sengupta**

  Abstract: In classical gravity theory, we present explicit examples of vacuum solutions that admits the possibility of time travel (to the past) through their geodesics. These geometries are built upon metrics whose determinant can continuously go to zero over some extended region of the spacetime. These solutions to the first order field equations satisfy the energy conditions. One may see the existence of these solutions as a motivation to revisit the status of causality in the formulation of classical gravity.

- **14:30-14:50**

  Title: **Measurement problem in General Relativity?**

  Speaker: **Nirmalya Kajuri**

  Abstract: We discuss the question if space-time measurements perturb space-time geometry irreducibly. We discuss the implications of this for a quantum theory of gravity.

- **14:50-15:10**

  Title: **The Cosmological horizon and quadrupole formula in de Sitter background**

  Speaker: **Jahanur Haque**

  Abstract: One of the physical realizations of gravitational waves is that they carry energy. Though there is no gauge invariant local definition of gravitational stress-energy tensor, in the special context of two widely separated scales, Isaacson defined an effective gravitational stress tensor for the ripples. Energy computed from effective stress tensor is well understood for weak gravitational waves in Minkowski background. In de Sitter background space-like character of future null infinity $\mathcal{J}^+$, makes the definition of energy subtle. A spatially compact source in de Sitter background also provides a distinguished null hypersurface, its cosmological horizon, $\mathcal{H}^+$. In this talk, I will discuss how Isaacson prescription can be adapted to compute energy flux in de Sitter background. Energy flux computed using effective stress tensor can be evaluated at $\mathcal{H}^+$ and matches with that computed at $\mathcal{J}^+$.

- **15:10-15:30**   Tea/Coffee Break

- **15:30-17:30** —— ShyamFest including a talk by Shyam.