



ICTS Astrophysics & Relativity Seminar

Title : Towards General Relativistic Boltzmann Transport for Binary Neutron Star Mergers

Speaker : Maitraya Bhattacharyya (The Pennsylvania State University, USA)

Date : Friday, 01 November 2024

Time : 2:00 PM (IST)

Abstract : We present a new neutrino transport code for binary neutron star merger simulations for the numerical relativity code AthenaK. We use finite element and spectral approaches to handle the angular dependence while energy discretization is handled using a finite volume scheme. We employ an asymptotic-preserving discontinuous Galerkin (DG) method for the spatial discretization to ensure correct behavior in the diffusion-dominated regime. A semi-implicit time stepping scheme is used to handle the stiff and non-stiff sources correctly. In the first part of the talk we describe the two approaches for angular discretization: the finite-element method in angle (FEMN) and filtered spherical harmonics (FPN) with an emphasis on positivity preservation for multi energy schemes. We also describe a strategy to obtain the two moments method (M1) from the formulated equations. We then compare the efficacy of the three approaches using various toy problems in the presence of a moving medium and general relativity.

Venue : Feynman Lecture Hall

Zoom Link: <https://icts-res-in.zoom.us/j/95290299734?pwd=C1PqqoPpFLbhHcb0Eu7ngwcacHfA0O.1>

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