Contribution ID: **102** Type: **not specified**

A perturbative approach to understanding ultrarelativistic motion using the Penrose limit

Tuesday, 4 July 2023 15:40 (20 minutes)

The local geometry around a null geodesic in an arbitrary spacetime resembles the geometry of a plane wave (PW) spacetime at leading order. This idea is called the Penrose limit. Families of curves that stay within this local neighbourhood of the null geodesic can be thought of as being "ultrarelativistic"in some suitable sense, and their motion is largely determined by the structure of the PW spacetime that results from the Penrose limit. Since PW spacetimes are highly symmetric, it is relatively easy to analyse the motion of a particular object in this PW spacetime. This talk describes how to appropriately define a family of ultrarelativistic objects, and how their equations of motion simply when mapped to the Penrose limit PW spacetime. Furthermore, I discuss a new perturbation theory, called the post plane-wave approximation (of which the Penrose limit is the leading order term) that can be used to simplify the equations of motion for ultrarelativistic objects.

Presenter: VASWANI, Aditya (Heidelberg University)

Session Classification: Poster session