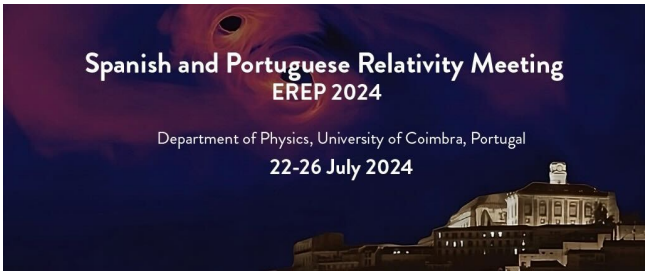

Contribution ID: **35** Type: **not specified**

Algebraic classification of 2+1 spacetimes

Tuesday 23 July 2024 17:00 (15 minutes)

We present a new and effective method of algebraic classification of 2+1 geometries. It parallels the approach of Newman and Penrose, and in our work, we extend this formalism into three dimensions. The spacetimes are classified into the types I, II, D, III, N and O using appropriate scalars constructed from the Cotton tensor, which are analogous to the Newman–Penrose scalars of the Weyl tensor in 4D. We also derive the Bel–Debever criteria, together with the multiplicity of the Cotton aligned null directions (CANDs). The classification is then nicely summarized using an algorithm based on the polynomial curvature invariants. This allows us to establish equivalence with the previous method of algebraic classification developed by García-Díaz and others. Lastly, we demonstrate the practicality of the new method on some explicit examples, such as the Robinson–Trautman spacetime with an aligned electromagnetic field.

Author: PAPAJČÍK, Matúš (Charles University)

Presenter: PAPAJČÍK, Matúš (Charles University)

Session Classification: Parallel session 7 (Mathematical Relativity)