

Contribution ID: 2020

Canadian Association of Physicists

Association canadienne des physiciens et physiciens

Type: Oral (Non-Student) / Orale (non-étudiant(e))

## Investigating a stellar system interior with an erfc metric.

Tuesday 12 June 2018 08:30 (15 minutes)

We have proposed, in a previous CAP conference, an erfc potential that can be integrated in a symmetric metric to define the space-time surrounding a static symmetric massive object. The geometry described by this metric provides a unique representation of a static symmetric stellar system that is continuous over all the coordinate ranges. No discontinuities and no singularities, coordinate or intrinsic, come into play. A first attempt to extend this analysis would be to interpret the resulting space-time equations in terms of an isotropic stellar interior, considering the corresponding  $T\mu\mu$  as describing a perfect fluid under an isotropic pressure P. Such an approach leads to inconsistencies, because the pressure cannot be assumed to be equal in all directions in the present model. A more realistic solution is obtained using the Pµµ and associating these to the field equations. Solving this system for the Pµµ provides relationships between the different components as well as analytical expressions for each one of these. As it can be seen with computer simulations, the erfc potential generates supplementary principal radial constraints and the Rµµ are directly linked to the pressure components. The energy momentum components generate internal pressure in the system and these pressure P11 and the two pressures P22 and P33 are equal and negative to maintain the equilibrium of this static model

Author: Prof. PLAMONDON, Réjean (École Polytechnique de Montréal)
Presenter: Prof. PLAMONDON, Réjean (École Polytechnique de Montréal)
Session Classification: T1-4 Mathematical Physics (DTP) | Physique mathématique (DPT)

Track Classification: Theoretical Physics / Physique théorique (DTP-DPT)