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Investigating a stellar system interior with an erfc metric.

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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 Tμμ 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 components generate space-time curvature. The energy density ρc2 produces an inward attractive pressure P11 and the two pressures P22 and P33 are equal and negative to maintain the equilibrium of this static model

Primary author: Prof. PLAMONDON, Réjean (École Polytechnique de Montréal)

Presenter: Prof. PLAMONDON, Réjean (École Polytechnique de Montréal)

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