Canadian Association of Physicists Association canadienne des physiciens et physiciennes

Contribution ID: **1593** Type: **CLOSED - Oral (Non-Student) / orale (non-étudiant)**

On the rotation of celestial bodies: an emerging phenomenon.

Tuesday, 30 May 2017 16:45 (15 minutes)

Studies of massive rotating bodies in the context of General Relativity are mostly based, directly or indirectly, on the Kerr metric. The rotation is assumed from the start and investigators try to fit various parameters to mimic the observed phenomena. None of the current approaches starts from scratch and proposes a metric from which the rotation terms intrinsically emerge. Over the last CAP conferences, we have studied in detail the static symmetric geometry described by a metric based on an erfc gravitational potential. This emergent potential had been derived from a general representation paradigm based on two fundamental assumptions (the principle of interdependence and the principle of asymptotic congruence) and on the exploitation of the Central Limit Theorem. Although this new metric provides a consistent set of predictions and interpretations regarding some open problems in the solar system, the residual offset incorporated in the erfc potential remains partly justified while its presence is a key element to support the new rationale. In this paper, we propose an axisymmetric interpretation of this general metric. The resulting axisymmetric geometry describes any massive body and its curved space-time, subject to a rotation and an expansion. The resulting solutions to the Einstein equations are simulated. The geodesics are derived in their second and first order mathematical description. Finally, the equatorial radial and orbital trajectories of particles and photons are studied suggesting that the axisymmetric geometry is a fundamental representation that could be used to study a large class of rotating massive objects.

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Session Classification: T4-4 General Relativity II (DTP) | Relativité générale II (DPT)

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