



Contribution ID: 61

Type: **Talk in a parallel session**

A geodesically complete ring wormhole

Thursday, 11 July 2024 17:00 (20 minutes)

In this talk the possible geodesic completeness of an electromagnetic dipole wormhole is studied in detail. The space-time contains a curvature singularity, and belongs to a class of solutions to the Einstein-Maxwell equations with a coupled scalar field that can be allowed to be phantom or dilatonic. Specifically, a numerical analysis is performed to examine congruences of null geodesics that are directed toward the singularity. The results found here show that, depending on the strength of the coupling between the scalar and electromagnetic fields, the wormhole can be either geodesically incomplete or complete. The latter case is the most physically interesting since it provides an explicit example in which a curvature singularity does not necessarily imply geodesic incompleteness.

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Session Classification: Wormholes, energy conditions and time machines

Track Classification: Alternative Theories (AT): Wormholes, energy conditions and time machines