Name: Michael Volkov

Affiliation: University of Tours

Title: Stationary generalizations for the Bronnikov-Ellis wormhole and for the vacuum ring wormhole

Abstract: We analyze the problem of constructing the stationary generalization for the ultrastatic wormhole solution supported by the phantom scalar field. The extreme simplicity of this solution suggests that its stationary version could be easily obtainable, however, no such solution has been found up to now. It turns out that the difficulty in finding this solution is not related to the scalar field, which can be eliminated within the Eris-Gurses procedure. The problem reduces to finding the stationary generalization for the vacuum wormhole sourced by a thin ring of negative tension, whose static limit is described by the locally flat geometry obtained from the Kerr metric in the zero mass limit. The corresponding solution of the vacuum Ernst equations is analytically unknown but can be constructed perturbatively and describes a rotating ring. This presumably describes the difficulty, since constructing solutions with an extended source is a non-trivial problem.