Universidade Federal de Pernambuco
DEPARTAMENTO DE FÍSICA - PÓS-GRADUAÇÃO

Seminário (WEBINAR)

The Painlevé VI tau-function of Kerr-AdS$_5$

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This seminar aims to present the method of isomonodromic deformations to treat linear perturbations of matter fields propagating in a five-dimensional Kerr-AdS black hole. Yet, the method applies to different space-times, as well as other physical systems.

The Klein-Gordon equation leads to radial and angular second-order ordinary differential equations with four regular singular points. The associated Fuchsian system can be deformed while preserving its monodromy data, where the isomonodromic equations reduce to the Painlevé VI (PVI) equation, with a consistent definition of the PVI tau-function a là Jimbo, Miwa, Ueno.

Using the tau-function, we can reformulate the eigenvalue problem of the radial (angular) Heun equation into an initial value problem of the corresponding tau-function. An asymptotic expansion for the separation constant is computed in terms of the angular PVI tau-function for slowly rotating or near-equally rotating black hole, while the quasi-normal modes are found in the small-radius limit.

Scalar QNMs for the s-wave case and even orbital quantum number turn out to be stable for small radius black holes. Instead, modes with an odd orbital quantum number do exhibit a regime of superradiance in this limit.

Furthermore, we consider vector perturbations in this background, where the separability of the Maxwell equations comes at the expense of the introduction of a new parameter mu, which can be associated with the apparent singularity of the isomonodromy method by a Möbius transformation. Finally, a numerical analysis is performed for QNMs in the ultra-spinning limit.

26 outubro de 2020 (segunda-feira) - 14 horas
Através do Google Meet:

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