

GR 8: Quantum Gravity and Quantum Cosmology

Time: Tuesday 16:30–17:10

Location: HBR 14: HS 2

GR 8.1 Tue 16:30 HBR 14: HS 2

Propagation of spinors on the angular deformed noncommutative black hole background — ●NIKOLA KONJIK¹, MARIJA DINITRIJEVIĆ ČIRIĆ¹, and ANĐELO SAMŠAROV² — ¹University of Belgrade-Faculty of Physics, Belgrade, Serbia — ²Rudjer Boskovic Institute, Zagreb, Croatia

Some noncommutative (NC) theories possess a certain type of dualities that are implicitly built within their structure. In this paper we establish still another example of this kind. More precisely, we show that the noncommutative U(1) gauge theory coupled to a NC scalar/spinor field and to a classical geometry of the Reissner Nordstrom (RN) type is completely equivalent at the level of equations of motion to the commutative U(1) gauge theory coupled to a commutative scalar field and to a classical geometry background, different from the starting RN background. The new (effective) metric is obtained from the RN metric by switching on an additional nonvanishing r - ϕ component. Using this duality between two theories and physical systems they describe, we formulate an effective approach to studying a dynamics of spin 1/2 fields on the curved background of RN type with an abiding noncommutative structure. We calculate QNM spectrum of fermions in this type of space.

GR 8.2 Tue 16:50 HBR 14: HS 2

Compact objects from effective quantum gravity —

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It has been shown that the UV finiteness of Superstring Theory can lead to the derivation of a family of regular black hole solutions in the gravity-matter decoupling limit. The latter is a regime governed by stringy effects like non-commutativity and T-duality. The most natural realization of a non-local structure inheriting noncommutative geometry effects is the Gaussian profile for the energy density in the relativistic stress tensor.

In this talk, we present two interesting regular black hole/compact object alternatives that stem from postulating a smooth transition between a quantum gravity dominated region at the origin, and a corona of degenerate nuclear matter around it. The derivation of the resulting semi-classical metric allows for the description of a regular horizonless Planckian object and a neutron star with a quantum vacuum at its center.