

# Séminaire de matrices, cordes et géométries aléatoires

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A simple quantum test for smooth horizons

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Recently, validity of Strong Cosmic Censorship conjecture has been subject to extensive debate. Majority of the work has focussed on classical smoothness of inner horizon of Reissner-Nordstrom or Kerr black holes. We propose a necessary condition for smoothness of a quantum state in the vicinity of a null surface. We study "near-horizon" modes defined near a patch of the null surface and show that, in any smooth quantum state, these modes must be "correctly entangled". This test is considerably simpler than computing the full renormalized stress tensor. We implement this test for Reissner Nordstrom black holes in Anti-de-Sitter space and BTZ black holes. We provide evidence for instability of the Cauchy horizon of RN-AdS in the Hartle-Hawking state. For BTZ black holes, we find that modes defined just outside the Cauchy horizon pass our test. We briefly discuss the possibility and implications of extension of spacetime beyond the inner horizon.

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