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Title: Searching for signal of quantum collapse through X-ray Emission Patterns

Abstract:

One of the main conundrums of physics is the quantum-to-classical transition. Models of Dynamical wave function Collapse (DCMs) explain it by a progressive reduction of the quantum superposition, proportional to the increase in mass of the system under consideration. Gravity-related collapse models, like the one developed by Diosi and Penrose (DP), aroused growing interest in the last decades, for the privileged role that gravity may play to solve the measurement conundrum.

The VIP-2 experiment, operated at the Laboratori Nazionali del Gran Sasso (LNGS) of INFN, is pursuing high sensitivity searches for “spontaneous radiation” signal, a faint radiation which would be unavoidably emitted by charged particles, as a side-effect of the collapse mechanism.

The strong bounds set by VIP-2 on the DP, the Continuous Spontaneous Localization and other dynamical collapse mechanisms will be presented. Future theoretical and experimental developments will be outlined.