

A possible quantum gravity observation: cosmic rays from Planck stars, or black-to-white hole decay

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June 22, 2016

4:00 p.m. - Wilson Hall, One West

The possibility of observing quantum gravitational phenomena, viewed as remote until not long ago, is increasingly considered to be plausible. Here I focus of a potentially observable phenomenon: black holes are classically stable, but can decay via a quantum gravitational tunneling akin to standard nuclear decay. Loop quantum gravity can be used to compute the corresponding lifetime. This could be much shorter than the Hawking radiation time, making the effect astrophysically relevant. Preliminary estimates indicate that centimeter-size primordial black holes should be exploding today and predict impulsive high energy as well as microwave signals tantalizing similar to the Fast Radio Bursts recently observed by the Arecibo and Parkes radio telescopes. The signal should have a characteristic distance/frequency relation which will allow to test the Planck star hypotheses in the near future.