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Underground tests of Quantum Mechanics: Collapse Models and Pauli Exclusion Principle

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We are experimentally investigating possible departures from the standard quantum mechanics' predictions at the Gran Sasso underground laboratory in Italy. In particular, we are searching signals predicted by the collapse models which were proposed to solve the "measurement problem" in quantum physics. I shall discuss our recent results published in Nature Physics, where we ruled out the natural parameter-free version of the gravity-related collapse model. I shall then present more generic results on testing CSL collapse models and discuss future perspectives. Finally, I shall briefly present the VIP experiment with which we look for possible violations of the Pauli Exclusion Principle by searching for "impossible" atomic transitions and comment the impact of this research in relation to Quantum Gravity models.

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