



UNIVERSITA' DEGLI STUDI DI PAVIA

DOTTORATO DI RICERCA IN FISICA

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Aula 102 "L. Giulotto", ore 16.00

Dipartimento di Fisica, via Bassi 6, Pavia

Testing Quantum Mechanics Underground: a hunt of the "impossible" Radiation

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Abstract: We are experimentally investigating possible violations of the standard quantum mechanics' predictions in the Gran Sasso underground laboratory in Italy. We test with high precision the Pauli Exclusion Principle and the collapse models of the wave function.

I shall present our method of searching for possible small violations of the Pauli Exclusion Principle (PEP) for electrons, through the search for "prohibited" X-ray transitions in copper and lead atoms, produced by "fresh" electrons (brought by circulating current) which can have the probability to undergo Pauli-forbidden transition to the 1s level already occupied by two electrons. I shall then present and discuss new results of a measurement of the spontaneous emission of X rays predicted by the dynamical reduction/collapse models that add a non-linear stochastic term to the Schrodinger equation. The experimental results set the most stringent limits on the collapse model parameter, lambda.