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## RESEARCH A CHALLENGE TO QUANTUM MECHANICS FROM ITALIAN RESEARCH

Last September 7, the journal Nature Physics published a theoretical and experimental study carried out by a team of researchers from

the Enrico Fermi Research Centre, INFN and the University of Trieste. The publication presents the results of research dedicated to verification of the quantum collapse model proposed by Lajos Diósi and Roger Penrose (DP model). The measurement phase was conducted at the INFN Gran Sasso National Laboratories, while the theoretical analysis was coordinated by the University of Trieste.

The fundamental characteristic of quantum systems is the possibility of existing in different states simultaneously, but the reason why this happens is not clear and is the subject of intense research. According to the DP model, quantum spatial overlapping becomes unstable and decays due to gravity in a time which is shorter the more massive the object is. The collapse generates a random motion, a background tremor, which in the case of electrons and protons is accompanied by the emission of characteristic but weak electromagnetic radiation. The research team went to look for this radiation, detecting a signal a thousand times lower than predicted by the DP model. The measurement therefore sets a record in this type of studies.