AWARDS

LNF LEADS THE QUEST FOR UNDERSTANDING THE FOUNDATIONS OF PHYSICS

Whether we can observe quantum behaviours in macroscopic objects or not, and under which conditions, is a major question in quantum physics. An answer in the positive direction will boost the quest for the use of the weirdness of quantum mechanics in a much larger set of physical systems, not restricted to the microscopic world.

A team of scientists including the group of the Frascati National Laboratories (LNF-INFN) led by Catalina Oana Curceanu have joined in a consortium to address this fundamental quest from an innovative standpoint, supported by a FET (Future and Emerging Technologies) 4.4 M€ grant awarded by the European Commission (EC). The Collaborative Project “TEQ” (Testing the large-scale limit of quantum mechanics) puts together 8 leading European research groups and the MSquared company to explore quantum effects at the large scale under the support of the EC Horizon 2020 research framework programme. The project is one of the only 26 funded proposals out of 374 submitted to the latest call for Future and Emerging Technologies projects.

The team will levitate a small particle within a well-controlled environment, with low temperature and low vibrations. In such an environment an indirect test of the QSP can be performed by analyzing carefully the noise that affects the centre of mass motion of the trapped particle. The measured noise will then be compared to theoretical predictions from different models – some of which assume a breakdown of QSP. ■