

LNGS SEMINAR SERIES

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Testing fundamental particle physics with neutrons and antiatoms

Two phenomena have been recently observed: gravitational and whispering gallery quantum states of slow neutrons in the vicinity of a surface. They are related by common experimental methods and mathematical descriptions, but also by their common applications in particle physics, quantum optics and surface science. Analogous experiments could be done with antiatoms. These phenomena could provide very sensitive tools for searching/constraining short-range fundamental forces of various kinds (extra bosons, extra spatial dimensions, axion-like particles, chameleon-type interactions, dark matter etc), as well as for direct studies of gravitational properties of antimatter. We present also associated experimental methods and techniques, as well as the status of the field in the world, and particularly the activities of GRANIT (neutrons) and GBAR (antiatoms) collaborations.

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