

Seminar

Dr. Laura Manenti

New York University Abu Dhabi

New ways of detecting dark photon dark matter: a dielectric haloscope equipped with a transition edge sensor

Monday, 12 December 2022, h. 14.00

Sala Wataghin, Physics Department, via Pietro Giuria 1, Torino

Abstract

A stream of evidence supports a model of the Universe where 85% of its mass is in the form of dark matter (DM), a new type of beyond-the-Standard-Model particle. While DM direct searches have mainly focused on detecting weakly-interacting massive particles (WIMPs), alternative models exist.

As WIMPs become less motivated, with large experiments ruling out the traditionally favoured parameter space, dark photons (DP) are receiving increasing attention among the alternative DM models. The DP arises naturally in extensions of the Standard Model by theorising the existence of an extra U(1) symmetry coupled to the U(1) gauge group of electromagnetism via kinetic mixing.

The New York University of Abu Dhabi and the Istituto Nazionale di Ricerca Metrologica have joined efforts to develop an experiment called QHaloS (Quantum Haloscope Search), which uses a detection technique called "dielectric haloscope" equipped with a transition edge sensor to search for light dark matter in the form of dark photons. During my talk, I will outline the experiment's status and where we are headed.

The speaker:



Laura Manenti is an experimental particle physicist working as Research Scientist at New York University Abu Dhabi. Before moving to the UAE in 2018, she was a postdoctoral research associate at University College London, where she worked on liquid argon time projection chambers' technology for rare event searches. She is now part of the world-leading experiment for direct detection of dark matter, XENON, while pioneering cutting-edge technology dubbed "dielectric haloscopes" to enhance the sensitivity to dark photons and axions.

Laura is very active in physics outreach, including giving lectures in high schools, making videos on YouTube about her research, and writing a physics book for children entitled "The littlest girls go inside an atom," which was endorsed by Arthur McDonald (Nobel Physics Laureate 2015) himself.