

SEMINAR: Qubits for non-demolition, single photon detection: a promising route to search for axion dark matter

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12:00 to 13:00

Blue Lecture Room

The evidence for cold dark matter in the Universe, with a mean density about 5 times that of baryonic matter, is nowadays clear beyond reasonable doubt. Among the candidates for dark matter, the original pseudoscalar axion stands out as a prediction from a theory that was purely conceived to solve a fundamental and inescapable problem in particle physics, the strong CP problem. Experiments using resonant cavities in strong magnetic fields have been pushing the upper limits to the axion-photon coupling at various axion masses to the interesting range of the axion model prediction.

At present, superconducting transmons are a promising technology to increase the sensitivity of single photon detection by a large factor, allowing axion searches to reach masses and couplings of high theoretical expectation for a potential discovery. In this talk I will present a reanalysis of the data of the first non-demolition experiment by Dixit et al. (2021), which points to the technical progress that is needed to make these experiments reach an optimal sensitivity.

Hosted by: Prof. Dr. Antonio Acín