Poster Session #A
Laboratory tests of gravitation

A19

Dark matter Axion search with riNg Cavity Experiment DANCE: Current sensitivity

Yuka Oshima (University of Tokyo)

We present the principle of Dark matter Axion search with riNg Cavity Experiment (DANCE) and the status of the prototype experiment, DANCE Act-1. To search for axion-like dark matter, we aim to detect the rotation and oscillation of an optical linear polarization caused by the axion-photon coupling. Optical path length is effectively increased with a cavity, and the rotation angle of the polarization can be amplified to be detected. In the case of a linear cavity, the rotation of polarization is inverted by reflection at the mirror and rotation effect is cancelled out. Our group proposed to use a bow-tie ring cavity to solve this issue. The final version of DANCE will improve the sensitivity to the axion-photon coupling constant for axion mass $< 10^{-10}$ eV by several orders of magnitude compared to the current best limits. A prototype experiment DANCE Act-1 with a cavity round-trip length of 1 m is underway to demonstrate the feasibility of our method and to investigate possible technical noises. Even with the shorter cavity round-trip length, smaller finesse and lower input power than the final DANCE, DANCE Act-1 can reach the sensitivity beyond the CAST limit. We have finished the assembly of the optics, obtained the data, and estimated current sensitivity. We are now trying to achieve the design sensitivity of DANCE Act-1 by hunting and reducing noises. In this session, we will report the current status of DANCE Act-1.