

Search for axion-like particles at the Jülich Cooler Synchrotron

Swathi Karanth, on behalf of the JEDI collaboration

Institute of Physics, Jagiellonian University, Cracow, Poland

A particle called the axion has been proposed to explain the small size of the CP violating term (θ_{QCD}) in quantum chromodynamics. It would be light in weight and weakly coupled to nucleons. If sufficiently abundant, it might be a candidate for dark-matter in the universe. Axions or axion-like particles (ALPs) when coupled with gluons introduce an oscillating Electric Dipole Moment (EDM) along the nucleons' spin direction. This can be used in an experiment to search for axions or ALPs in an storage ring.

At the Cooler Synchrotron (COSY) in Jülich, an experiment to search for ALPs was performed using an in-plane polarized deuteron beam and scanning the frequency space for the resonance between the $g-2$ spin precession frequency and the oscillating field. The revolution frequency, and hence the spin precession frequency, was scanned in order to find the resonance. The signal for axions will be the accumulation of the vertical component of the polarization when this condition is matched. The working principle of this method and preliminary results will be presented.