Contribution ID: **66** Type: **Presentation**

Status and plans of the International Axion Observatory

Wednesday 20 June 2018 10:15 (20 minutes)

Axions are a natural consequence of the Peccei-Quinn mechanism, the most compelling solution to the strong-CP problem. Similar axion-like particles (ALPs) also appear in a number of possible extensions of the Standard Model, notably in string theories. Both axions and ALPs are very well motivated candidates for the Dark Matter, they appear in other cosmological scenarios involving inflation, dark radiation or even dark energy, and could also solve some long-standing anomalous astrophysical observations. If they exist, they would be copiously produced at the sun's interior. A relevant effort during the last decade and a half has been the CAST experiment at CERN, the most sensitive axion helioscope to-date. The International Axion Observatory (IAXO) will be a fourth generation axion helioscope, born as a large-scale ambitious follow-up of CAST. As its primary physics goal, IAXO will look for solar axions or ALPs with a signal to background ratio of about 5 orders of magnitude higher than CAST. For this, IAXO envisions a large multibore superconducting magnet designed to optimize the axion helioscope figure of merit, extensive use of x-ray focusing optics and low background x-ray detectors. IAXO will venture deep into unexplored axion parameter space, thus having discovery potential. The first step of the project, called BabyIAXO, features a scaled-down system (but of dimensions representative of the full infrastructure), with a single-bore magnet and one full scale detection line. BabyIAXO will already enjoy competitive sensitivity (of about 2 orders of magnitude in signal-to-noise-ratio better than CAST) and will deliver relevant physics outcome.
BabyIAXO and IAXO have also potential to host additional detection setups. Most interestingly, the large magnetic volume available could be used to host haloscope-like setups to detect relic axion or ALPs potentially composing the galactic halo of Dark Matter. IAXO has the potential to serve as a multi-purpose facility for generic axion and ALP research in the next decade.

Primary author: Dr IRASTORZA, Igor (Universidad de Zaragoza)

Presenter: Dr IRASTORZA, Igor (Universidad de Zaragoza)

Session Classification: Plenary presentations