26. Deutsche Physikerinnentagung 2022 (German Conference of Women in Physics)



Contribution ID: 95

Type: Poster

The QSNET-Network of high-precision clocks and the quest for light dark matter.

Saturday, November 26, 2022 4:00 PM (2 hours)

Beyond the Standard Model, scalar field dark matter may induce distinct variations in fundamental constants, be it through temporal oscillations or transient changes. With a novel approach, the QSNET project aims to find evidence of new physics by linking observed variations in atomic transition frequencies in a network of ultraprecise atomic, highly charged ion (HCI) as well as molecular clocks to variations in both the fine-structure constant and the electron-to-proton mass ratio. Comparing two from up to seven clocks located at four English institutions in a fibre-linked networked approach, allows for the measurement of frequency ratios with unprecedented precision. Here we give a short overview of the physical background of QSNET, the proposed configuration and coupling of the different clocks, as well as their anticipated performance and scientific goals. Implementing the Lomb-Scargle method allows for a preliminary assessment of QSNET's potential prospects and limitations in achieving high detection confidence for low-mass scalar dark matter.

Category

Particle / Astroparticle / Cosmology (Experiment)

Author: KREIENBAUM, Saskia (Humboldt-Universität zu Berlin)

Co-authors: Prof. WORM, Steven (DESY); Dr SCHWANKE, Ullrich (Humboldt-Universität zu Berlin); KOZHIPARAM-BIL SAJITH, Lakshmi Priya (DESY & Humboldt-Universität zu Berlin)

Presenter: KREIENBAUM, Saskia (Humboldt-Universität zu Berlin)

Session Classification: Poster session

Track Classification: Physics Posters