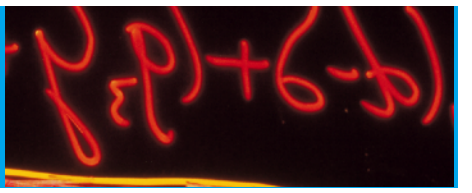
DESY
Particle and Astroparticle Physics Colloquium



Peeking into the Dark Sector with ALPS II.

Tuesday, 5 December, 2023
Auditorium & Webcast 16:00 h

This is a HYBRID colloquium
Meeting ID: 996 1652 8733
Meeting Password: 733220

Aaron Spector (DESY)

The Any Light Particle Search II (ALPS II) is a light-shining-through-a-wall (LSW) experiment running at DESY, that is currently probing the dark sector of our universe for axions and other beyond the standard model particles. LSW experiments exploit the coupling between axions, photons, and magnetic fields to create a relativistic axion field that effectively allows a laser to pass through a wall at the center of the experiment. The amount of power measured at the end of the experiment is then related to the strength and length of the magnetic fields, the initial laser power, and the axion-photon coupling constant g. ALPS II is the first LSW experiment to use optical cavities both before and after the wall, as well as a heterodyne detection system to search for the single photon per day signals. These techniques, along with other upgrades, will allow ALPS II to boost its relative signal strength by 12 orders of magnitude compared to previous LSW experiments and achieve a sensitivity with respect to g that will be a factor of 1000 beyond the current limits on the axion-photon coupling. This talk will give an introduction to LSW experiments and how the optical system is able to extend the sensitivity of ALPS II so far beyond its predecessors, while also giving a preliminary look at the results from the first science campaign.

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