Contribution ID: **41** Type: **Talk**

Search for dark matter with magnetic resonances

Wednesday 5 July 2023 09:00 (35 minutes)

Axionlike particles (ALPs) are candidates for dark matter that are strongly motivated by theory and are searched for in a plethora of experiments. At the Cosmic Axion Spin Precession Experiments (CASPEr) we exploit techniques based on nuclear magnetic resonance spectroscopy to probe possible non-gravitational couplings between dark matter and ordinary matter. This allows for sensitivity to ALPs over a large mass range, we currently aim to probe the range from 10ˆ-22 eV up to 2.5 10ˆ-6 eV. I will present our results obtained for various mass ranges and will discuss recent measurements at approximately 6 neV which are currently being analyzed. Attention will be paid to our work on the stochastic nature of the ALP field, daily and annual modulations, and gravitational lensing as well as methods to improve our sensitivity in future measurements.

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Session Classification: Quantum Sensors