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First Results from the GigaBREAD Experiment

Wednesday, 8 November 2023 14:45 (15 minutes)

We will discuss the first results from the GigaBREAD experiment. GigaBREAD is a 10.7-12.5 GHz search for dark photons which completed its first round of data taking during the summer of 2023. GigaBREAD is a pilot experiment which is the first to implement the novel BREAD reflector geometry. The BREAD reflector is designed to enhance a dark photon or axion-like particle signal by focusing microwaves (or optical photons) to an antenna/sensor at the focal spot of the reflector. GigaBREAD couples a BREAD reflector to a custom microwave coaxial horn antenna to search for dark photon and axion-like particles in the gigahertz regime. A signal is received at the horn antenna and passes through an amplifier chain to an FPGA DAQ board which performs a real-time FFT and allows for efficient integration of small signals due to its low dead-time. Additionally, we discuss plans to search for axion-like particles in the same frequency range by placing the GigaBREAD detector in a 3 T magnet at Argonne National Laboratory.

Early Career

Yes

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