

Dark Matter Axion Search Using 18T High Temperature Superconducting Magnet

Saturday 1 April 2023 09:00 (15 minutes)

We report details on the axion dark matter search experiment that uses the new technologies of a high-temperature superconducting (HTS) magnet and a Josephson parametric converter (JPC). An 18 T HTS solenoid magnet is developed for this experiment. The JPC is used as the first stage amplifier to achieve a near quantum-limited low-noise condition. A first dark-matter axion search was performed with the 18 T axion haloscope [Y. Lee et al., Phys. Rev. Lett. 128, 241805 (2022)]. The scan frequency range is from 4.7789 GHz to 4.8094 GHz (30.5 MHz range). Our results set the best limit of the axion-photon-photon coupling in the axion mass range of 19.764–19.890 micro-eV. We will discuss the details of the 18T haloscope experiment and its results.

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Track Classification: Axions, Alps, Wisps as dark matter