

Magnetoresistance in copper at high frequency in high magnetic field

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In halo dark matter axion search experiments, microwave cavities are employed to detect signal from the axion-photon conversion. To enhance the conversion power and reduce the noise level, cavities are typically placed in strong magnetic fields at sufficiently low temperatures, respectively. Axion mass is allowed in a broad range ($1\text{ ueV} \sim 1\text{ meV}$), whereas current cavity-based experiments are designed to explore relatively low mass regions. As search for higher mass axions requires higher frequency microwave cavities, understanding cavity properties at high frequencies in extreme conditions is deemed necessary. In this poster, we present a study of the magnetoresistance of copper using a cavity with a resonant frequency of 12.9 GHz in magnetic fields up to 15 T at the liquid helium temperature, 4.2 K.

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