

High-temperature superconducting cavities for dark matter axion search at CAPP

mercredi 7 août 2024 08:30 (20 minutes)

Superconducting radiofrequency technology has boosted scientific productivity by enhancing the quality (Q) factor of resonant cavities in various particle physics applications. A high Q factor is also essential for increasing the scanning speed of cavity haloscope experiments. The Center for Axion and Precision Physics Research (CAPP) has been leading in developing high-temperature superconducting (HTS) cavities, achieving Q values up to 10^7 in multi-tesla magnetic fields, which is two orders of magnitude higher than traditional copper cavities. This significant advancement has been widely utilized in axion searches at CAPP. CAPP is developing new cavities, including a 36-liter HTS cavity for the CAPP-MAX experiment with DFSZ sensitivity and multi-cell HTS cavities for high-mass axion searches. This presentation will detail these notable developments.

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