

Status and prospects of the SABRE North experiment and NaI(Tl) crystal radiopurity

Tuesday, 9 July 2024 14:20 (20 minutes)

The SABRE experiment aims to deploy arrays of ultra-low-background NaI(Tl) crystals to carry out a model-independent search for dark matter through the annual modulation signature. SABRE will be a double-site experiment, consisting of two separate detectors reliant on a joint crystal R&D activity, located in the Northern (LNGS) and Southern hemispheres (SUPL). For over 10 years, SABRE has conducted extensive R&D on ultra-radio-pure NaI(Tl) crystals. Several crystals have been grown and tested in both active and passive shields at LNGS. Based on these results, SABRE North is proceeding with a full-scale design incorporating purely passive shielding. To achieve an unprecedented level of radiopurity for NaI(Tl) crystals, SABRE North is employing zone refining purification of the NaI powder prior to growth. We will present the first results from the zone refining activities and predictions on the ultimate radio purity achievable for the crystals. Additionally, the status of the SABRE North installation at LNGS will be discussed.

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Session Classification: Parallel 1

Track Classification: Parallel session: Direct detection