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The Study of Tungsten Thin Films for Ultra-low Tc Superconducting Transition Edge Sensors for 0νββ Experiment

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Cryogenic crystal calorimeters are among the most competitive detector technologies for future neutrinoless double beta decay (0νββ) experiments. The dual readout of photon and thermal signals based on Transition Edge Sensors (TES) is essential for future large-scale deployment of these calorimeters. The quality and thickness of the superconducting thin films, as the core component of the TES, will affect the detector's sensitivity. In this study, we systematically investigate the relationship between the thickness of superconducting tungsten thin films and their grain size, resistivity, stress, and transition temperature. The results reveal that an optimal film thickness yields larger grains while minimizing both the resistivity and transition temperature of the film.

Collaboration you are representing

Authors: Ms 刘, 圆圆 (北京师范大学); 王, 宇 (北京师范大学); Mr 张, 建杰 (北京师范大学)

Presenter: 王, 宇 (北京师范大学)

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