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Progress of CryoCsI detector R&D from COHERENT

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This presentation will detail the latest advancements in the development and characterization of a 6.6 kg proto-type CryoCsI detector, comprising two 3.3 kg cesium iodide (CsI) crystals operated at around 90K. Key performance metrics of the detector, including light yield optimization, spatial uniformity of signal response, and long-term stability under sustained cryogenic conditions, will be discussed to establish its viability for large-scale deployment. Additionally, results from a precision quenching factor measurement of pure CsI at low temperatures will be presented, providing critical insights into the scintillation efficiency of the material in recoil-based detection scenarios. Comprehensive steady-state background measurements, conducted to identify and mitigate noise sources, will be highlighted to demonstrate the detector's capability to operate in low-background environments. Finally, projections for the expected event rate of coherent elastic neutrino-nucleus scattering (CEvNS) interactions and the detector's resulting physical sensitivity to beyond-Standard-Model physics will be outlined, underscoring its potential to advance neutrino and dark matter research in upcoming phases of the experiment.

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Session Classification: Experiments 6