

A cold ejector-supported krypton system for future highly irradiated detectors

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A future upgrade of the Large Hadron Collider (LHC) at CERN will expose silicon-based particle detectors to higher radiation levels requiring temperature levels below than what is currently attainable with the CO₂ cooling system (2PACL). A fluid-based approach suggests the noble gas krypton as a promising cooling agent for thermal management of detectors within the range -60 to -80°C. Its thermo-physical properties, together with the controlled and slow cooldown to avoid thermal shock of the sensors requires to completely revise the cooling technology. Motivated by this, a new ejector system has been developed to provide cooling, starting from ambient conditions and gradually lowering the temperature to the levels required for conducting physics experiments.

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