

Diamond detectors for low-mass dark matter searches

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Despite the multiple and convincing evidence of the existence of Dark Matter (DM) in our Universe, its detection is still one of the most pressing questions in particle physics. For this reason, in recent years a large fraction of the direct detection scientific community started to explore the possibility of detecting DM with mass in the sub-GeV range. Cryogenic diamond detectors have the potential to detect such light DM candidates thanks to their superior cryogenic properties. When operated as low-temperature calorimeters, diamonds could reach an energy threshold in the eV range and would allow for the exploration of novel parameters of the DM-nucleus cross section. In this contribution, the preliminary cryogenic performance of lab-grown single crystal diamonds operated with TES temperature sensors will be presented. The potential of such a detector in the current landscape of DM searches will be also illustrated.

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