

Searching for Light Dark Matter with Narrow-gap Semiconductors - the SPLENDOR Experiment

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The SPLENDOR (Search for Particles of Light Dark Matter with Narrow-gap Semiconductors) experiment is a search for light dark matter via the electron-recoil interaction channel, taking advantage of novel single-crystal narrow-bandgap (order 10-100 meV) semiconductors. Synthesized within the collaboration, the properties of these designer materials imply low dark counts when operated as ionization detectors at cryogenic temperatures. Using a readout scheme based on low-noise cryogenic high electron mobility transistors (HEMTs), the experiment is on track to achieve $O(1)$ electron-hole pair resolution. This provides an excellent opportunity to probe new light dark matter parameter space: down to sub-MeV masses for fermionic dark matter and sub-eV masses for bosonic dark matter. I will review the multidisciplinary R&D behind SPLENDOR, discuss the current status of the experiment, and present projected sensitivities for planned dark matter searches operated both above- and below-ground.

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