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## Direct dark matter searches using ALPS II's TES detector

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The elusive Dark Matter (DM), proposed due to its gravitational interaction with ordinary matter, supposedly makes up  $\sim 25\%$  of our universe. Various models aim to explain the origin and properties of dark matter, many of these proposing beyond standard model particles to make up most of the DM in our universe. The ALPS II (Any Light Particle Search II) light-shining-through-walls experiment will use Transition Edge Sensors (TESs) to detect low-energy single-photons originating from axion(ALP)-photon conversion with rates as low as  $10^{-5} \text{ s}^{-1}$

Even beyond ALPS II, these superconducting microcalorimeters, operated at cryogenic temperatures, could help search for further particle-DM candidates. Much of the work to ensure the viability of the TES detector for use in ALPS II, such as calibrating the detector and mitigating external sources of backgrounds, also leads to the ability to utilize the TES for an independent direct-DM search. For this purpose, the superconducting sensor, sensitive to sub-eV energy depositions, can be used as a simultaneous target and sensor for DM-electron scattering for sub-MeV DM. Hence, direct DM searches with TES could explore parameter space as-of-yet inaccessible by nucleon-scattering experiments.

### Collaboration / Activity

ALPS II

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