

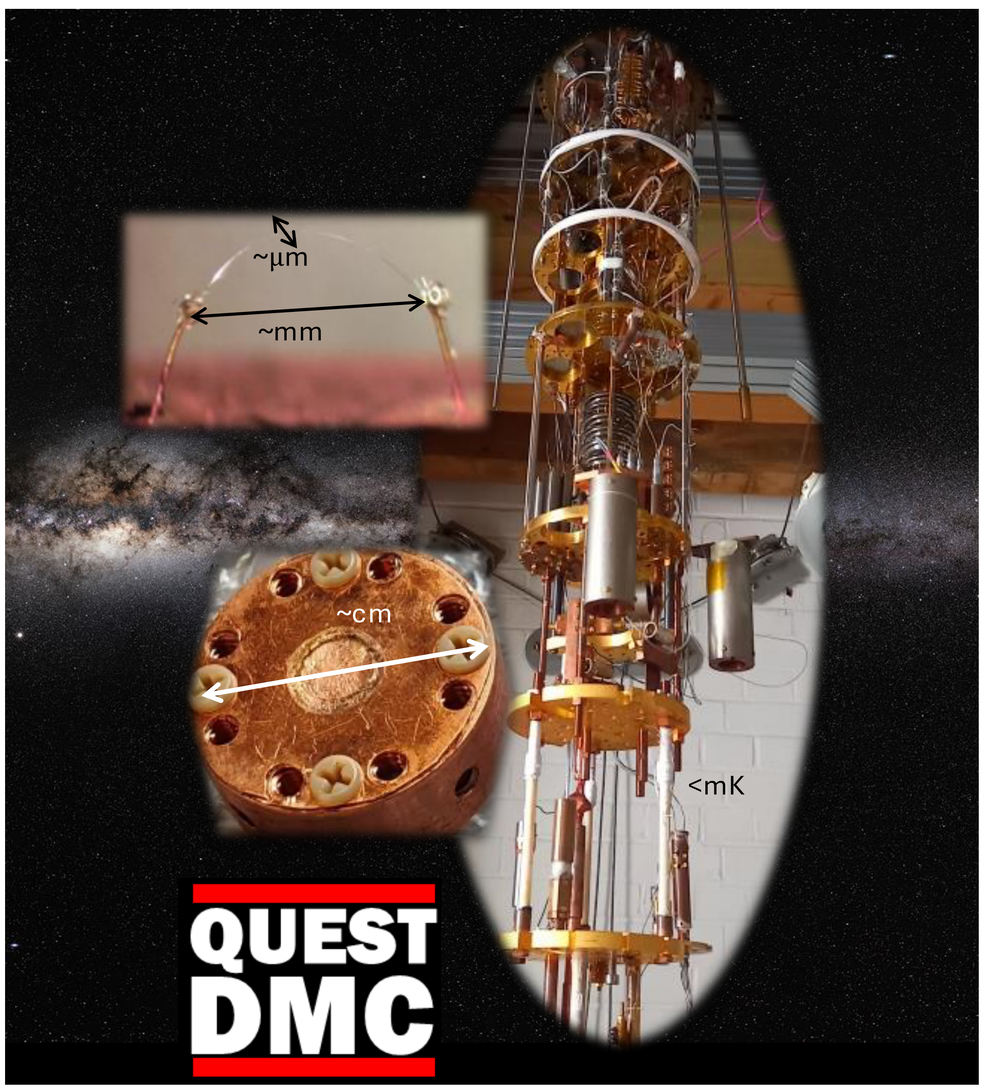
KCETA Colloquium

QUEST-DMC: Low-Threshold Dark Matter Detection in Superfluid Helium-3

Thursday, Nov. 26, 2026
Kleiner Hörsaal A (CS) 15:45 - 17:00

Dr. Elizabeth Leason (Oxford)

Superfluid helium-3 bolometers can exploit the extremely low superfluid gap (10-7 eV) to give ultra-low energy threshold dark matter direct detection searches. This gives the potential to probe dark matter models with sub-GeV/c2 masses, in particular offering world-leading sensitivity to spin-dependent interactions. Realising this requires operation at ultra-low temperatures in the 100s uK regime, where helium-3 in the B phase has extremely low specific heat, in combination low noise detector readout.



QUEST-DMC measures quasiparticle density in superfluid helium-3, using novel vibrating wire resonators with SQUID readout. Recent measurements including resonator characterisation, energy calibration strategies and multiple resonator readout schemes will be shown, in addition to bolometer energy measurements. Phenomenology studies on many-body scattering effects and the sensitivity of QUEST-DMC to Earth shadowing effects and effective field theory searches will also be highlighted.

Please note:
The colloquium will also be live-streamed to B401 SR410 (CN).

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