

A millikelvin STM/AFM powered by an adiabatic demagnetization refrigerator

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We have recently demonstrated that adiabatic demagnetisation refrigeration (ADR) can be effectively used in an ultra-high vacuum millikelvin scanning tunnelling microscope (mK STM) [1,2,3]. Its main advantage is the absence of circulating cryoliquids, which allows for a modular design with complete electrical control and eliminates the need for mechanical pumping during the STM session. Another advantage of ADR is the precise temperature control. In this contribution, we reveal a new mK STM/AFM prototype (Figure 1) with high-frequency wiring and in-STM single atom (molecule) deposition source and announce our plans for its commercialisation.

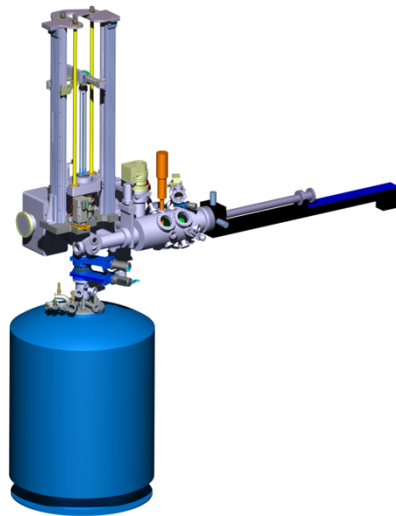


Figure 1. The figure shows a 3D model of the millikelvin STM/AFM.

Reference

- [1] T. Esat et al. *Rev. Sci. Instrum.* **92** (6) 063701 (2021).
- [2] T. Esat et al. *Phys. Rev. Res.* **5**, 033200 (2023).
- [3] T. Esat et al. *Commun. Phys.* **6**, 81 (2023).