

Sub-Kelvin Capabilities

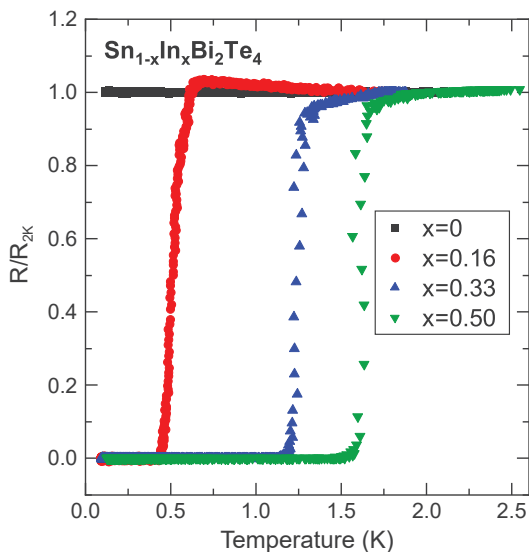
Adiabatic Demagnetization Refrigerator (ADR)

DynaCool (D810) / PPMS (P810)

For basic transport experiments not requiring applied magnetic field, the base temperature of the PPMS® can easily be extended as low as to 100 mK using the Adiabatic Demagnetization Refrigerator (ADR). This option includes a specialized puck which integrates a sealed capsule of paramagnetic salts. After the puck is cooled to the base temperature of the PPMS (1.9 K) a magnetic field (3 T) is applied and the system pumped to a high-vacuum state. Quickly turning the field off allows the magnetic entropy of the salt to increase, which in turn rapidly cools the sample platform to 100 mK. Measurements can then be collected as the temperature slowly rises back to the PPMS base.

Key Features:

- Extends zero-field transport measurements (ETO/Resistivity) down to 100 mK
- Allows for more than 2 hours of measurement time below typical PPMS base temperature
- Two 4-probe channels available for increased sample throughput
- Permanently sealed chamber of paramagnetic salts does not require replacing for the lifetime of the option



Resistance showing superconductivity in the doped topological insulator $\text{Sn}_{1-x}\text{In}_x\text{Bi}_2\text{Te}_4$. For more information see: Michael A. McGuire et al., Superconductivity by alloying the topological insulator SnBi_2Te_4 , Phys. Rev. Mater. 7, 034802 (2023).

ADR Specifications

Accessible Temperatures

Range: 150 mK to 300 K
(100 mK base typical)

Accessible Temperatures

Time to ADR Base Temperature from 300 K: 3 hours
Time from 0.1 to 1.9 K (Uncontrolled Drift): 2 hours (typical)

Operational Range

0.1 to 2 K; 0 T

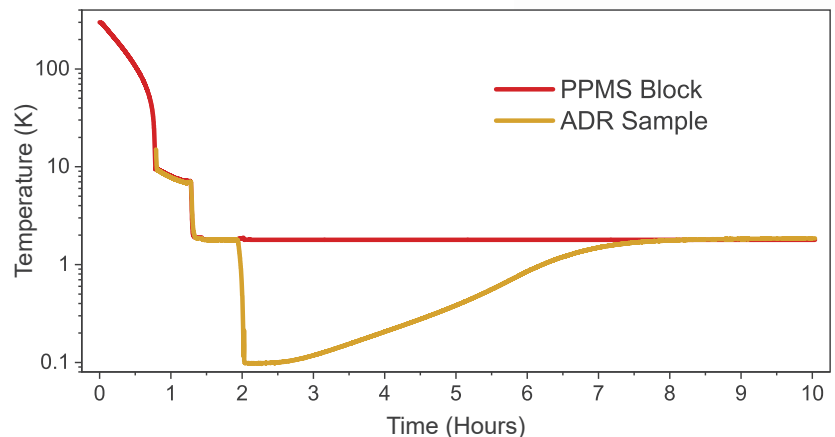
Specifications are subject to change without notice.



Included user kit for the ADR with additional transport pucks and a USB drive with archived thermometry calibration files.



ADR with transport puck installed



Example log of an ADR cooldown, starting from room temperature. In this case, base temperature is reached in just over two hours and the uncontrolled drift back to the PPMS block temperature lasts roughly six hours.