

QSHS – quantum sensors for the hidden sector

- QSHS is a resonant cavity search for halo dark matter axions.
- Facility at Sheffield has achieved 6T magnetic field, cavity temperature of 18mK running in our dilution refrigerator. This is the lowest base temperature of any cavity axion search world-wide.
- Currently building up quantum limited receiver electronics in collaboration with our partner groups at **Sheffield Oxford, Lancaster, UCL, NPL and Royal Holloway**, as well as with **ADMX**.
- Collaboration with the US ADMX underway with a first demonstration of superconductor coated tuning elements in 6T magnetic fields.
- First science data planned for early 2025.
- Main risks are to funding – like other QTFP funded projects, we currently don't have firm support beyond 31st March 2025.
- Rival groups looking for QCD axions in the a similar mass range (25 to 40micro-eV) include Haystac (Yale, USA), Capp (South Korea), MaxMax (EU), QUAX (INFN).
- QSHS provides a critical infrastructure for training young scientists in quantum technologies and techniques.

