



This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under GA No 101004730.

Vacuum group solution

ASTeC

UKRI

IFAST KICK OFF MEETING

iFAST



UK Astronomy Technology Centre
Edinburgh, Scotland



Polaris House
Swindon, Wiltshire



Chilbolton Observatory
Stockbridge, Hampshire



Daresbury Laboratory
Daresbury Science and Innovation Campus
Warrington, Cheshire



Rutherford Appleton Laboratory
Harwell Science and Innovation Campus
Didcot, Oxfordshire



**Isaac Newton Group
of Telescopes**
La Palma



Joint Astronomy Centre
Hawaii

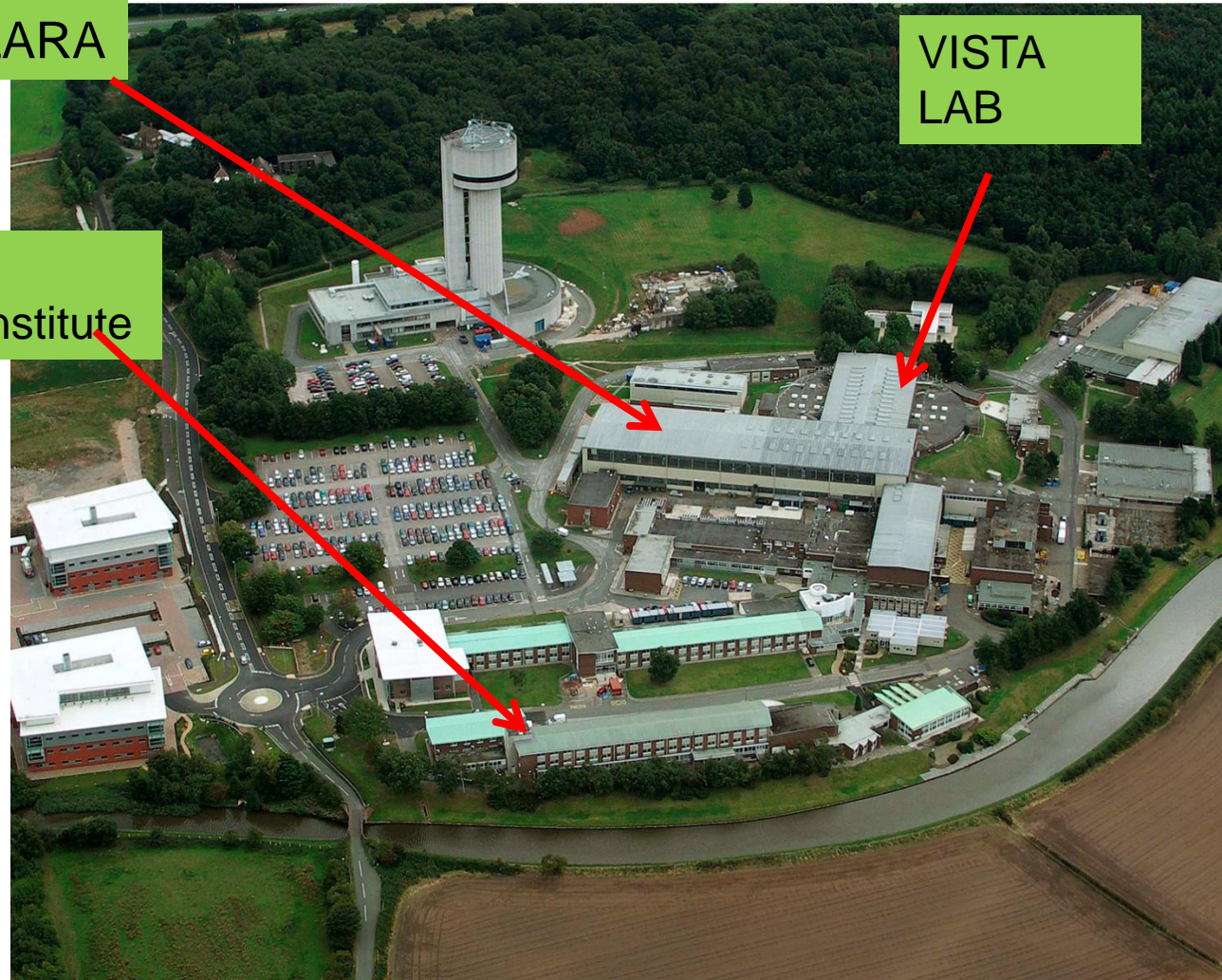


Daresbury Science and Innovation Campus - DSIC

VELA , CLARA

VISTA
LAB

ASTeC &
Cockcroft Institute



SC coating on Copper

- **Magnetron sputtering from a single target of correct stoichiometry (prepared by powder sintering)**
- **Stoichiometry, Substrate Temperature, Deposition Rate, Deposition Thickness, Substrate Bias, Concurrent Ion Bombardment can be varied independently**

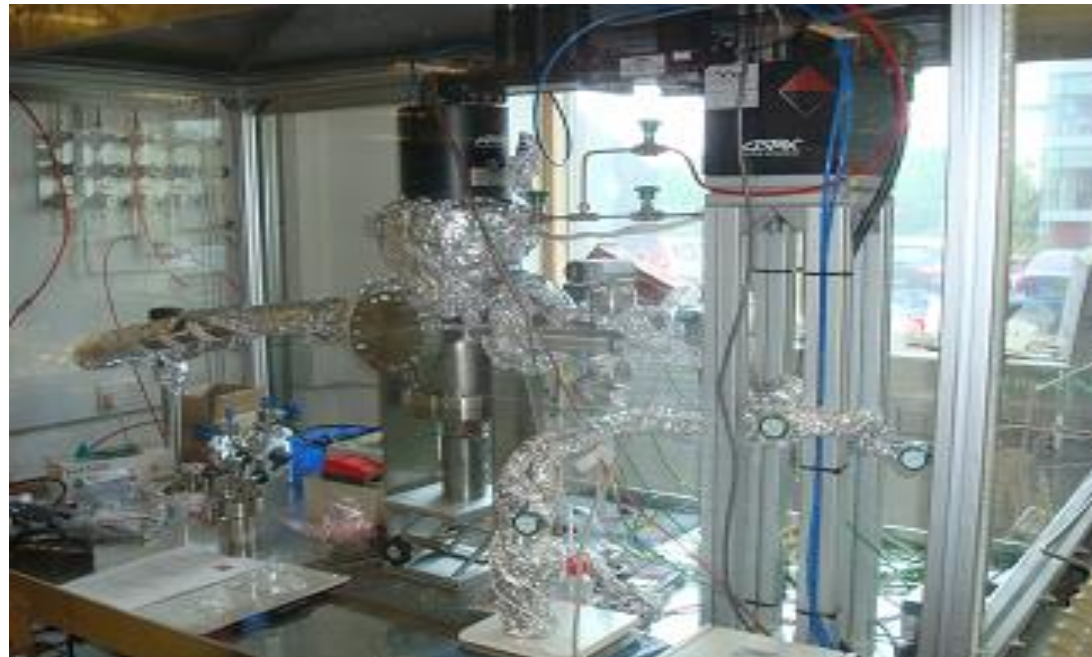


Multilayer SC/Insulator coating

- **CVD Process in which one or more precursors, present in vapor phase, chemically react on an appropriate warm substrate, giving rise to a solid film**

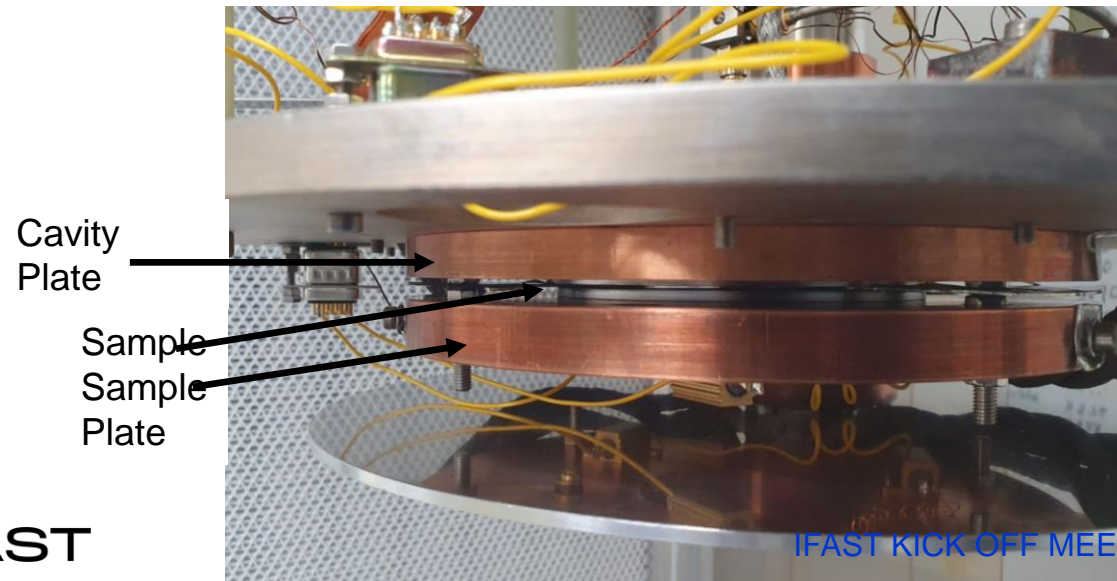
Deposition rate and structure of the film depend upon temperature and reagent concentration

⇒ Uniformity of temperature and flow of gaseous over entire cavity surface may be difficult with complex geometry



RF Superconductivity evaluation for Task 9.3, 9.5 or 9.6

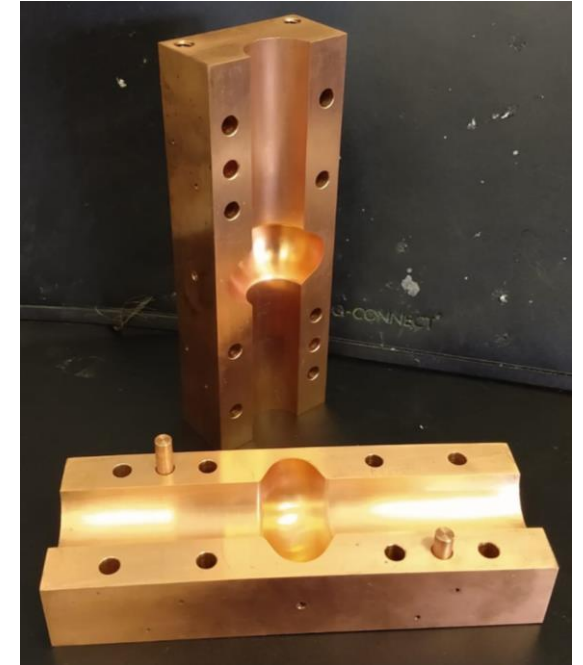
- At **STFC** a radiofrequency (RF) cavity and cryostat dedicated to the measurement of superconducting coatings at 7.8 GHz has been updated to operation with a closed-cycle refrigerator.
- **Low power measurements** with an emphasis **on fast turn-around time** (~2 days for each sample).
- A cooldown demonstrated
 - $T_{cavity} = 4.0$ K and $T_{sample} = 4.0$ K.
- **Flat Sample** – a disk diam. 100 mm
- **RF testing with a bulk Nb sample is in progress**



Pill-box cavity in a new facility with a closed-cycle refrigerator in STFC

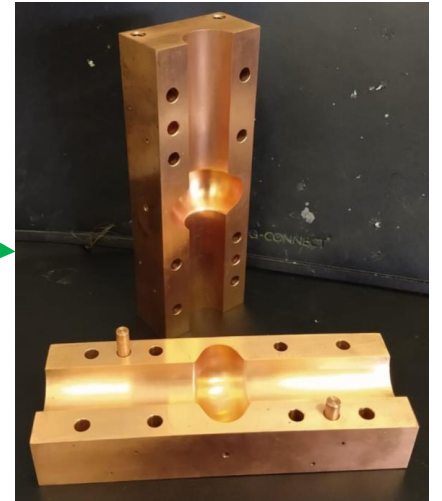
6 GHZ CAVITY TESTING FOR TASK 9.3

- Delivery D9.3 includes the RF test of cavities coated with thin films different from Nb (M36)
- Split cavity:
 - Easy to coat with either conventional planar magnetron or in tubular geometry used for RF cavities
 - Easy to inspect
 - Cavity design: Graeme, Philippe, Taaj
 - 4 cavities has been manufactured
- Testing in EXP900 – dry cryostat
 - Parts will be produced in ETC – *in progress*
 - **Required fully operational and tested –**
 - **ASAP but not later than May 2022**
 - Cleanliness (crablab environment)
 - Cryochamber vacuum ($\sim 10^{-7}$ mbar)
 - Cryogenic (~ 4.0 K) is available
 - Limited power (radiation safety SHE limits)
 - RF:
 - VNA - OK
 - Amplifier?



6 GHZ CAVITY TESTING FOR TASK 9.3

- Testing in LHe (optional)
 - No overlap with 7.8 GHz tests
 - Split cavity – available
 - LHe cryostat – available
 - Cavity in a dedicated vacuum chamber
 - Under design
 - Clean room assembly
 - Required in ~12 months (May 2022)
 - LHe from SuRF (to ready Aug-Oct 2021?)
 - GHe recovery line (to ready Aug 2021)
 - A possibility of lower temperatures (1.9-4.2 K)
 - Pumps, gauges
 - A possibility of **high power test**
 - Bunker (?)
 - Amplifier (?)
 - Less microphonics
 - If there are any problem at EXP900



iFAST



This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under GA No 101004730.