Nb_3Sn on Cu:

Motivations for Cu substrate

- **Cheaper** than Nb
- Higher **thermal conductivity**
- Higher **mechanical stability**
- **PVD technology** (Nb on Cu) already used for:
  LEP, LHC, HIE-ISOLDE @ CERN
  ALPI @ INFN LNL

Different technologies under study:

- PVD
  - Magnetron Sputtering
    - Single Target
    - Double Target
  - HiPIMS
- CVD
- Electroplating
- Bronze Route

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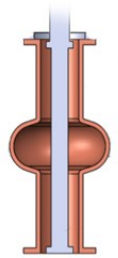
Nb_3Sn on Cu by PVD

- ***R&D is Focused on Coating Parameter Optimization to get the right phase at lowest Working T possible***
- *No RF test yet on cavities available*
- *Only a couple of preliminary tests on QPR @CERN*

Strategies

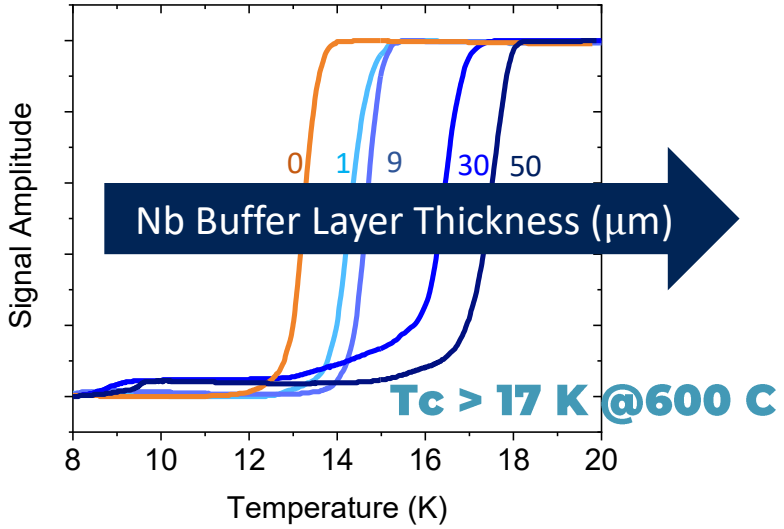
Single Target configuration easier to scale into cavities



@ CERN and JLab HiPIMS to densify coating

@ STFC DCMS-HiPIMS comparision

@ INFN **thick Nb buffer layer** (barrier and accommodation effect) improve dramatically Tc



Multiple Challenges

- A15 are Brittle materials
- Complicated Phase Diagram
- Substrate preparation
- Low melting point substrate
- Interface diffusion
- Target Production

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