Session 6a: Bring us your coupons

- **@Cornell** (*Matthias Liepe*, Yi Xie) TE host cavities with high surface fields (**100 – 250 mT**) Q vs H Full T mapping of Bottom Plate 2 K Very good Hs/Hc ratios 1.4, 1.57

- Pill-box TE **(Ready April)**
  - TE_{011}, f = **6 GHz** Demountable sample bottom plate r_{sample} = **3.5 cm**
  - TE_{011}, f = **6 GHz** Small round sample plate r_{sample} = **0.25 cm**
- High gradient TE cavity, type A **(Ready June/July)**
  - Demountable sample bottom plate: r_{sample} = **5 cm**
  - TE_{011}, f = **5 GHz** r_{sample} = **5 cm**
- High gradient TE cavity, type B
  - Demountable sample bottom plate: r_{sample} = **5 cm**
  - TE_{012}, f = **4.78 GHz**, TE013, f = **6.16 GHz**
- @TAMU (Nate Pogue, Peter McIntyre, Charlie Reece-Jlab)
- f=1.4 GHz B_{max} > 200 mT 2 K Hs/Hc ~4
  - **02/12** Begin characterization of **6”** samples using Test Cavity
  - Quench normally starts on the ring, at half radius where the peak surface field exists
  - High-H-field characterization of SRF sample surfaces **09/12**

Session 6b: Existing Facilities

- **@SLAC** (*Tsyoshi Tajima-LANL et al.*) 2” diam. Disk
  - **11.4 GHz** 50 MW Klystron
  - short pulses (≤ 2 μs) – can separate thermal effect from critical field
  - TE_{013}-mode Cu hemispherical host cavity (cryocooled)
  - Q vs T already compared for ref Nb vs MgB_2 coating

Coupon Experiments

- Relatively low cost
  - Multiple variants – fast turnaround 2 or 3 per week?
  - Community needs to guide priorities
  - Q droop still possible with high Hs/Hc
- Re-use instrumentation – tmapping etc.
- Small samples = easier to control
  - Easier to characterize afterwards by microscopic techniques
- Are they representative enough of "real" cavities?
  - Flat sheet vs cavity
  - Opportunity as well as hinderance

Session 6c: "Microscopic techniques"

- **@Jlab** (Larry Phillips, Daniel Bowring) Local Electronic Mean Free Path Niobium : measurement of R_s *at various frequencies* ω_i
  - Possible application to defect scanning in Nb sheet.
- Superconducting coaxial resonator in TEM modes.
  - Resonator and variable coupler are S.C. Nb with sapphire
  - dielectric and are conduction cooled in vacuum to 2K.
  - Measurements of R_s *at various frequencies allows a* tomographic reconstruction of $L_e(x)$.
- (Preliminary) finite element simulation using CST, electric field at ~28 GHz.
- Any sufficiently high-*Q resonator material can be used* instead of 2 K Nb.
- Not as good as magnetometer for ferromagnetic defects.
  - Simultaneous multiple frequencies provide better sensitivity.
- **@JLAB** (Steven Anlage) Near-field Microwave Microscopy Of Superconducting Materials - (Next Generation under development – utilize improvements in HD technology)
- ~1 µm - stimulate Nb surface with large (B_{RF} ~200 mT) RF field and induce nonlinear response.
- **Micro-Loops (50 T pulses achieved!)**
- **Laser Scanning Microscopy** (Jlab collaboration (Karlsruhe) and FSU (Abraimov) have YBCO results)
- **New Possibilities? Large surface coating MO? Large area PCT**