

Plan of Dielectric Loaded RF Cavity

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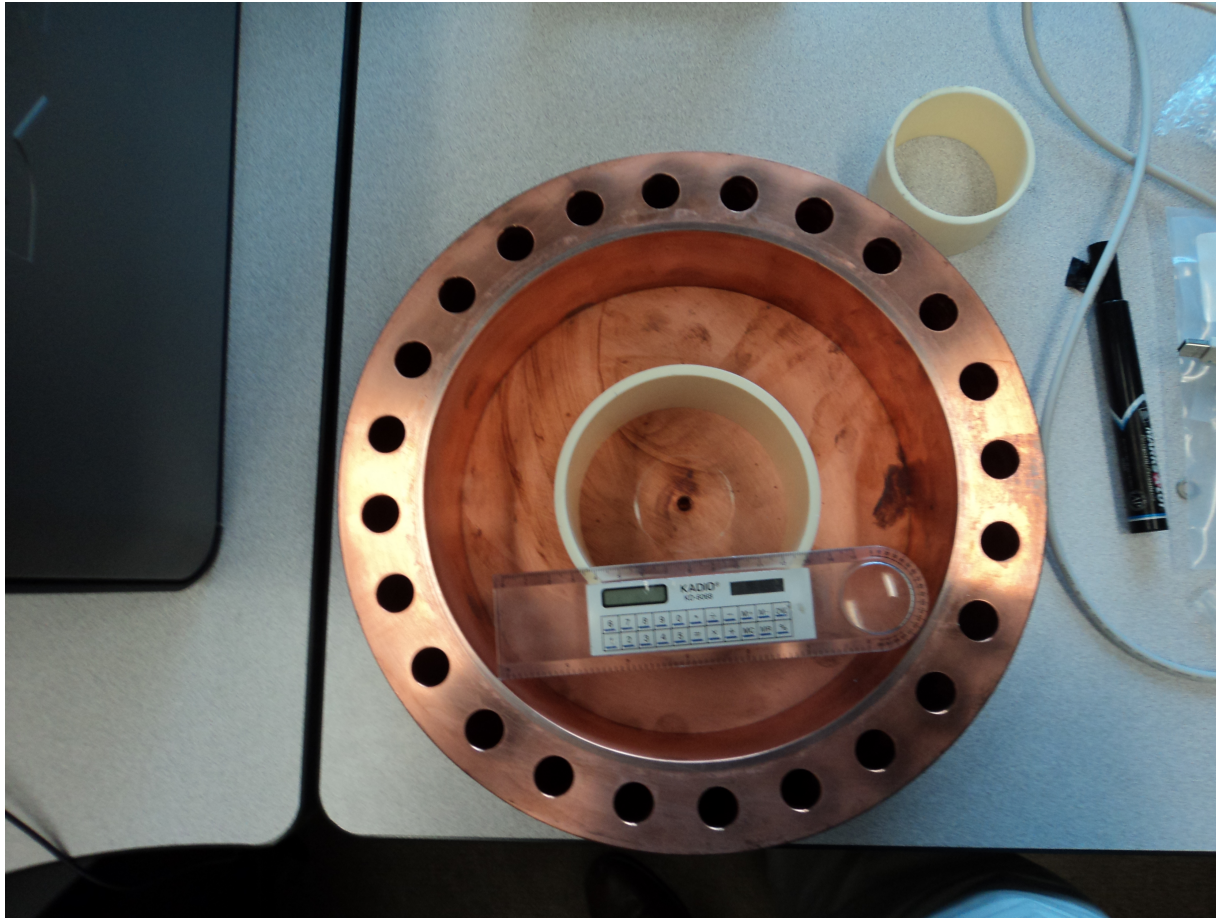
Discussion on dielectric loaded RF cavity

- Goal: Dielectric loaded RF cavity will be a solution to incorporate RF into small coil
- Current status: One preliminary test has been done and published. The data was taken in a poor quality RF system.

Here is plan

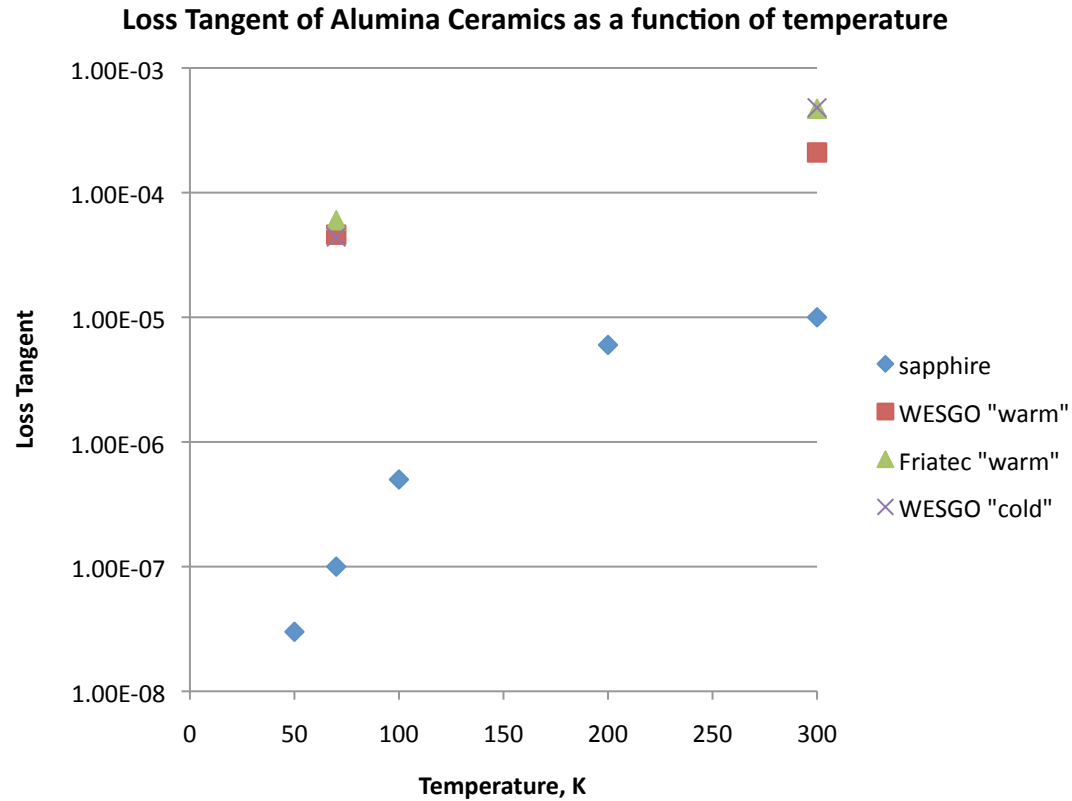
- Find people who has already investigated this type of cavity
 - SLAC has investigated for long time
- Low power measurement: Measure RF Q & frequency in real RF cavity w & w/o dielectric material and temperature dependence
 - We have all elements (RF cavity & ceramics & network analyzer & cables)
 - Need some simulation efforts (summer student?)
- High power measurement: Apply high power RF and measure RF Q & frequency in real RF cavity with dielectric material and dense gas
 - Need support from MAP

RF cavity & ceramics



- RF Q ~ 16,000
- (Loss tangent)⁻¹ = 10³ ~ 10⁴
- Use a special glue to fix the ceramic tube in the cavity
- Or make a teflon support

Loss tangent vs temperature



- Probably, diamond would be other good material
- Gems cost a lot although they are very attractive!