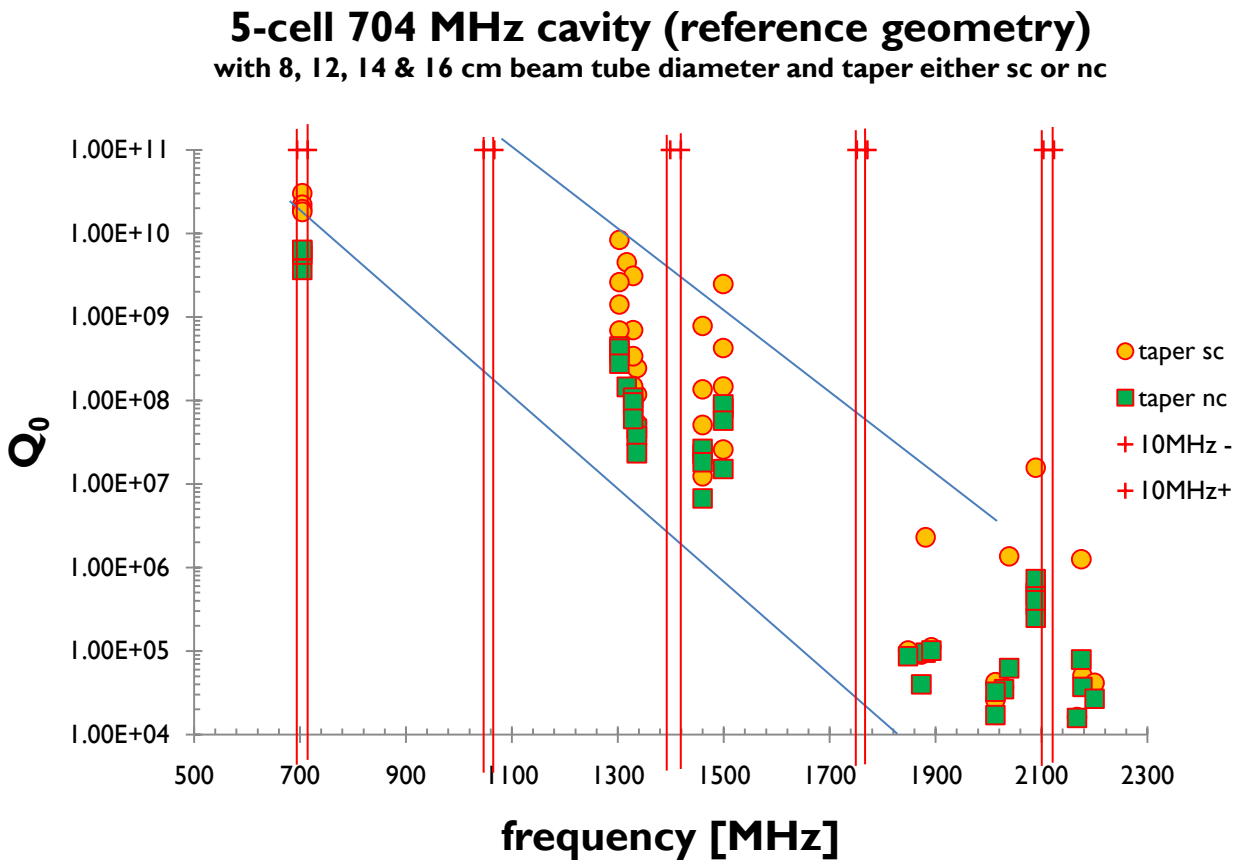
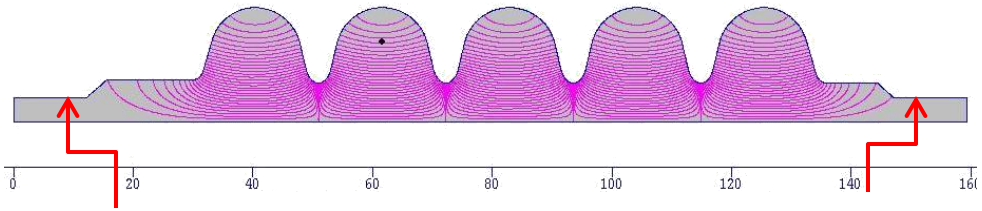
Beam tube damping *estimations* for SPL cavity cont'd

W. Weingarten

HOM damping with normalconducting beam tube



HOM damping with two 50 Ω antennas in beam tube $Ø_i$ = 3.6 cm



positions of HOM coupler port centroids at 3 cm away from transition small beam tube to taper

$$Q_L = Q_0 \cdot \frac{1}{1 + \frac{P_{ant}}{P_c}}$$

$$P_{ant} = \frac{1}{2} \cdot Z_0 \cdot I^2$$

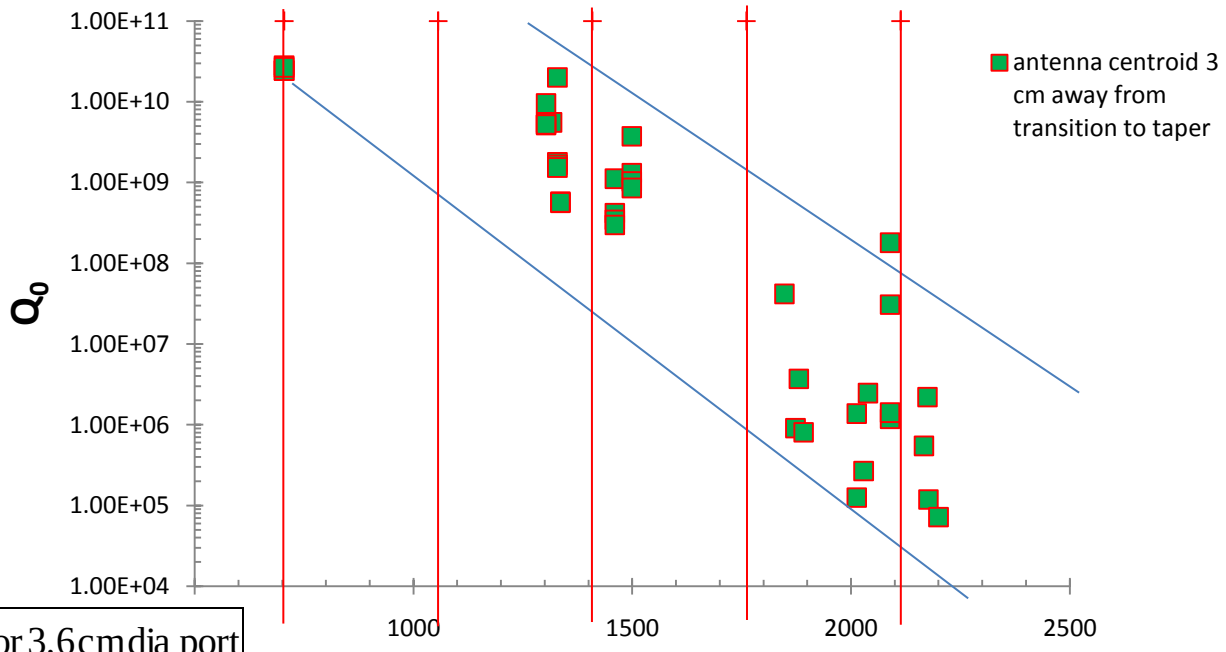
$$I = j \cdot \pi r_i^2$$

$$j = \omega \varepsilon_0 E$$

$$P_{ant}[W] = 2862 \cdot (f/GHz)^2 \cdot (E/MV/m)^2 \text{ for } 3.6\,\text{cm dia port}$$

5-cell 704 MHz cavity (reference geometry)

with 8 cm beam tube diameter with 2 HOM antennas



2nd *preliminary* conclusion

- In the range 1300 – 1500 MHz, damping HOMs is difficult by either
  - dissipation in beam tube or
  - antenna placed in beam tube
- Trimmed antenna HOM absorbers seem to be needed
- ***More comprehensive studies required***