

Second ILC Workshop
WG5: Superconducting Cavities and Couplers

Cavity shape

Rong-Li Geng
LEPP, Cornell University
Snowmass, August 18, 2005

BCD: TESLA Shape

- Adequate shape for BCD gradient 35 MV/m.
- Extensive tests and experiences exist:
 - * 35 MV/m demonstrated with beam.
 - * HOMs, wakefields well studied.
 - * over 80 cavities fabricated.
 - * 40 cavities running in TTF.
 - * 1000 cavities to be built for XFEL.
- R&D should focus on fabrication and process improvements to produce 35 MV/m reproducibly.

ACD: LL shape & RE shape

- Choice for higher gradient capability of 45-50 MV/m.
- 47 MV/m with $Q\ 1e10$ achieved in two single cell Cornell RE cavities processed/tested respectively at Cornell and KEK.
- Strong R&D must continue to build and test 9-cell LL and RE cavities. KEK has built four 9-cell LL cavities. Cornell 9-cell RE cavities plan underway.
- R&D of field emission suppression is priority.
- Some new shapes have smaller iris diameter. Impacts need asses. Allowable iris diameter should be determined (help from other WG's needed).

ACD: LL shape & RE shape

- Recommended criterion based on technical potential for justifying ACD shape to take over BCD shape is six new shape cavities of > 45 MV/m at Q of $\geq 0.5E10$ (CW or pulsed).
- Recommended criterion based on cost saving for justifying ACD shape to take over BCD shape is achieving 35 MV/m at Q of $1E10$ with a better yield than BCD shape.
- Editorial note-H Edwards, I do not agree- new shapes must be tested in multi cavity modules with beam and show that they meet HOM and Darkcurrent specifications as well as Grad & Q