Pruning the Decision Tree

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MTA RF Meeting
Nov 28, 2011 – Fermilab

Acceleration for muon cooling

Potential solutions we are pursuing at the MTA for RF in external magnetic field

1. Better materials: more robust against breakdown (melting point, energy loss, skin depth, thermal diffusion length, etc.)
2. Surface processing: suppress field emission (superconducting RF techniques, coatings, atomic layer deposition)
3. Magnetic insulation: modified cavity/coil designs to keep B$\perp$E on cavity surfaces
4. High-pressure gas: suppress breakdown by moderating electrons

Scorecard

Branch	Hardware	E_{surf} [MV/m]		$E_{"acc"}$
		B=0	B=3T	(B=0)
Baseline	805-pillbox	40	16	40
		20	10	20
Baseline	HPRF-Cu-button	50	-	35
Baseline	805-4season	29	-	29
Materials	805-W,Mo-buttons	38-39	18-20	22-23
	805-TiN/Cu-button	38	24	22
Materials	805-Be-button	40	31	13
Surface proc.	201-pillbox	21	14(0.4T)	21
MagIns/surf.	805-box	50	22-33	0
HPRF/Mat.	805-Mo-button	64	65	45
	805-Be-button	52	-	36