

What is the timeline and milestone path
to a machine with films technology with
 $E_{\text{acc}} > 16 \text{ MV/m}$, and $Q > 1.5 \cdot 10^{10}$?

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Target Performance for the Thin Film Development

- Frequency options for FCC are restricted to low/medium frequencies (beam dynamics)
- 400 MHz at 4.5 K seems to be the Nb/Cu option of highest interest (and in closest reach)
- High frequency at low temperature further down the road (and for high turn around during R&D phase)

Mid-term goal
400 MHz, 4.5 K
2-3·10⁹ at 10-20 MV/m

Long-term goal
2 K performance close to
bulk Nb up to 20 MV/m

Long-term goal
Nb₃Sn/Cu and/or V₃Si/Cu
at 4.5 K beyond Nb

RF Parameters - summary table (6/2/2017)

	H		t	
I _{beam} [mA]	30.0		6.6	
Nb bunches	770		78	
RF voltage [GV]	3.00		10.00	
Energy loss/turn [GeV]	1.67		7.50	
Bunch Length (mm)	3.00		3.00	
frequency [MHz]	400	800	400	800
cavity technology	Nb/Cu	Nb	Nb/Cu	Nb
operating temp	4.5	2.0	4.5	2.0
accelerating gradient [MV/m]	10	20	10	20
Nb cavities	200/beam	200/beam	667	667
Nb cell / cav	4	4	4	4

Nb/Cu R&D on 1.5 GHz Cavities (until 2001)

Full exploration of magnetron sputtering on 1.5 GHz single cell cavities

Milestones:

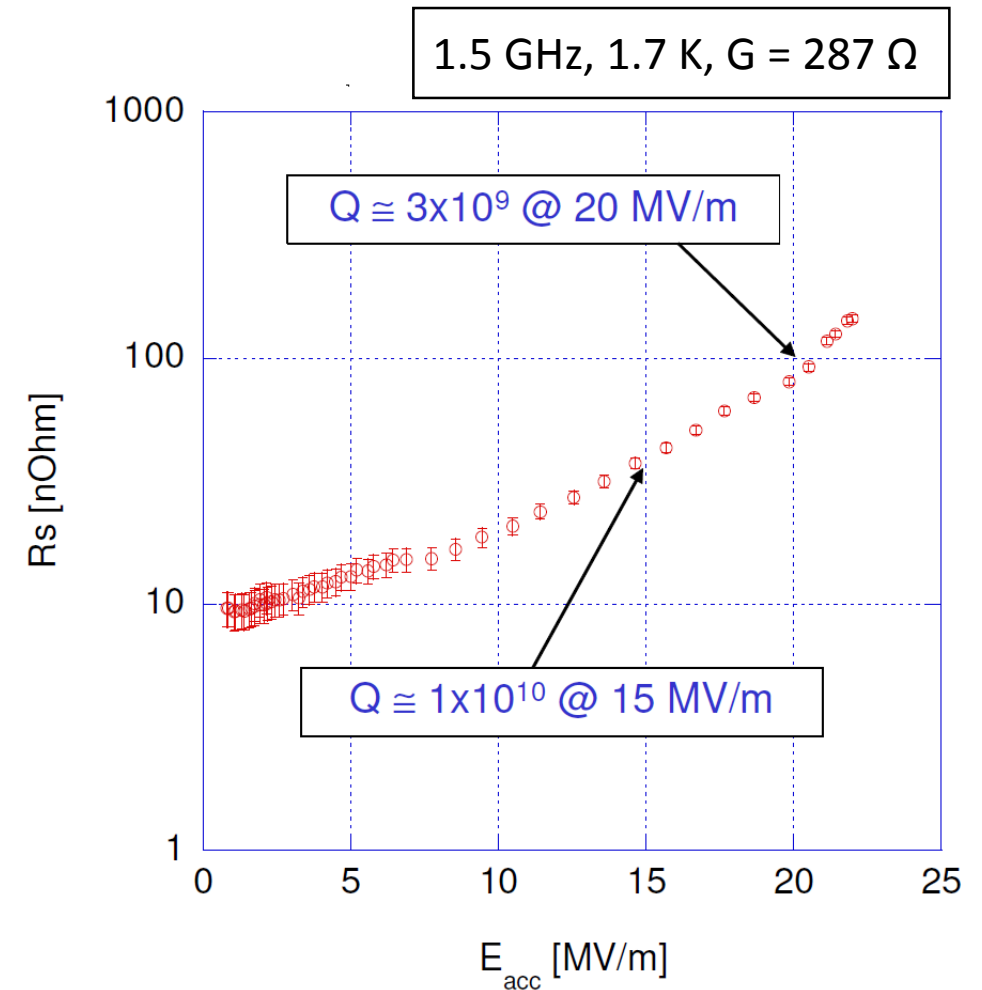
- ✓ Seamless cavity fabrication (spinning)
- ✓ Surface preparation (EP + SUBU)
- ✓ Coating parameters

Manpower:

- ✓ 4 people on the coating side (incl substrate preparation)
- ✓ 1-2 technicians for surface chemistry
- ✓ 3-4 people on the RF/cold test side

Timeline:

- ✓ About 300 coatings over 5 years



Timeline for FCC

Seamless cavities:

- ✓ 1.3 GHz single cell cavities for R&D
- ✓ 400 MHz single cell: under study
- ✓ 800 MHz single/multicell: under study

Electro-polishing:

- ✓ 1.3 GHz single cell
- ✓ 400 MHz single cell: planned
- ✓ 800 MHz single/multicell: planned

Coating benches:

- ✓ 1.3 GHz single cell (HIPIMS & DCMS)
- ✓ 400 MHz single cell (DCMS, can be upgraded for HIPIMS)
- ✓ 800 MHz multicell: under design

