

Superconducting RF Facility

Specific requirements for
protons and muons
with respect to e^+ / e^-

Superconducting Proton and Muon acceleration need **similar cavities** as linear colliders, except for some **differences**:

RF frequency:

- lower than ILC: 200 MHz (μ) ... 800 MHz

Lorentz force detuning:

- elliptical cavities $\beta=0.5 \Rightarrow$ **weaker cavities**
- **rapid pulsing** (50 .. 100 Hz) \Rightarrow stronger mechanical resonant built-up



☞ Power Coupler:

- protons need more peak/average power

☞ Engineering considerations:

- modules might get (radio-)activated
 - ⇒ fast hands-on repair/maintenance
- highest reliability/accessibility (factories)
 - ⇒ short modules \neq long string ??
- ILC needs more E, Q_0 \Rightarrow potential \$ gain

☞ Special μ -requirement:

- single cell, very large opening

Specific R&D

- Optimized fabrication methods
- Power couplers (200 ... 800 MHz)
- Nb/Cu technology for 200 MHz μ -cavity
- [‘Mechanical developments’ (piezo, fast tuner, cryostats, ...) and their warm tests do not need to be addressed in the SC facility.]

Conclusion:

Test Facility Requirements

- ☞ Low (and high) power RF set-up for testing at 200 ... 800 MHz
- ☞ Cooling capacity and cryostat(s) of corresponding size
- ☞ Bunker(s) for testing the 'Mechanical developments' at cryo temperature
- ☞ Adequate priority for using the common resources