Superconducting RF Facility

Specific requirements for

protons and muons

with respect to e^+ / e^-

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Superconducting Proton and Muon acceleration

need similar cavities as linear colliders
(read: take what you get)

except for some differences:
(read: needs special development)

☞ <u>RF frequency:</u>

- lower than ILC:

200 MHz (μ) … 800 MHz (p)

☞ <u>Lorentz force detuning</u>:

- elliptical cavities β=0.5 ⇒ weaker cavities

(steeper side-walls, more cells/length)

- rapid pulsing (50 .. 100 Hz) ⇒

stronger mechanical resonant built-up

☞ Engineering considerations:

- modules might get (radio-)activated
  ⇒ fast hands-on repair/maintenance

- highest reliability/accessibility (factories)
  ⇒ short modules ≠ long string ??

- ILC needs more E, Q_0 ⇒
  ⇒ potential $ gain with reduced specs

☞ Power Coupler:

- protons need more peak/average power

☞ Special μ-requirement:

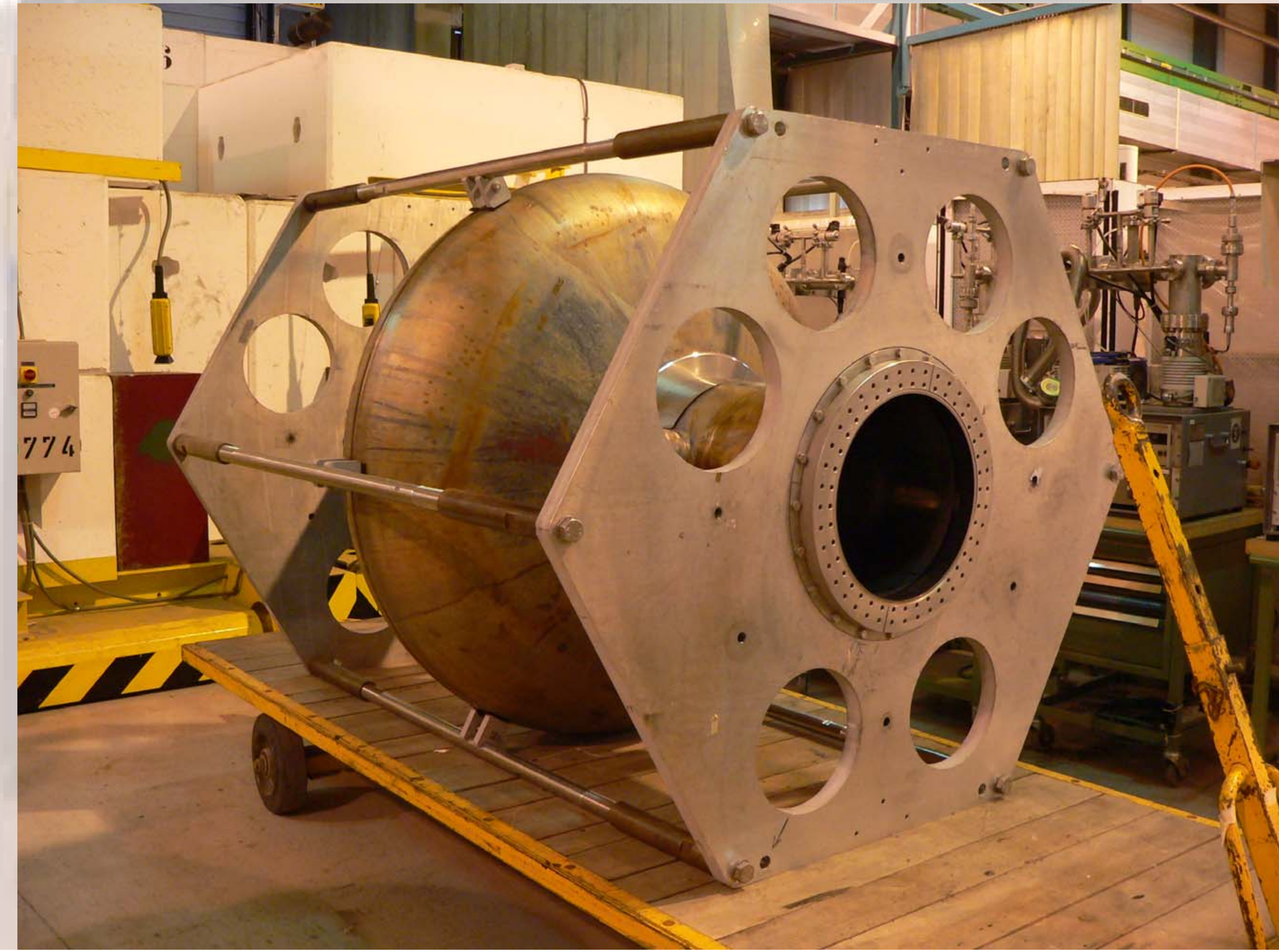
- single cell
- very large opening (transv. dispers.)

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.]

Prototype 200 MHz μ cavity, Nb/Cu technology



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