

Tesla Technology Collaboration

@F N A L

April 23 - 29, 2007

REPORT OF THE CHAIR

Progress and Highlights Sept. 2006 - April 2007

- There is considerable progress to report
 - Much more detail in the Regional Reports to follow

ASIA (courtesy Hitoshi Hayano)

Highlights of SC activities in Asia Oct.2006 ~Apr.2007

KEK (Japan)

- Vertical test of 4 TESLA-like 9cell were finished. (20~29MV/m)
- 1 TESLA-like and 1 LL 9cell were installed into the cryomodule.
- STF0.5 cryomodule test is in final assembly stage. The 1st cool down test is scheduled in May 14.
- New EP facility in KEK is in final assembly stage.
- Advance in surface treatment is achieved by 1 cell cavities study.

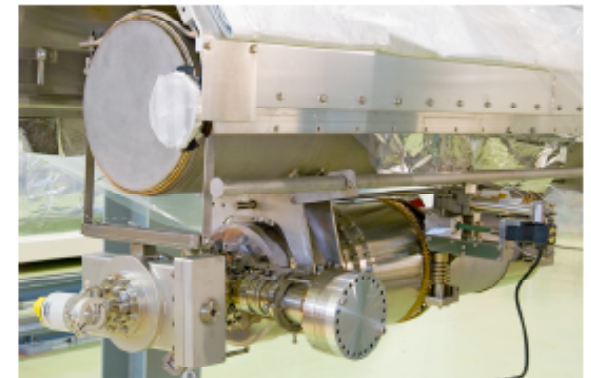
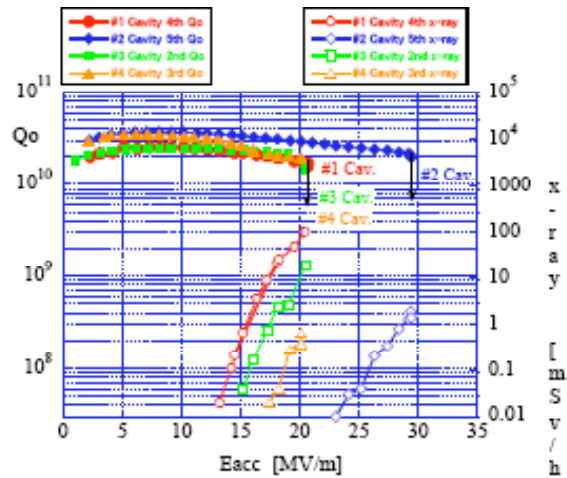
IHEP (China)

- Large grain 1 cell cavities, cryostat design study, SC-RF infra-structure.
- BEPC II 508MHz SC cavity operation.

Peking Univ. (China)

- Large grain 1 cell cavities, Large grain 2 cell cavity, Single crystal 1 cell cavities.

TTC KEK Highlights



STF cryomodule assembly
for STF phase 0.5 experiment



EP bed

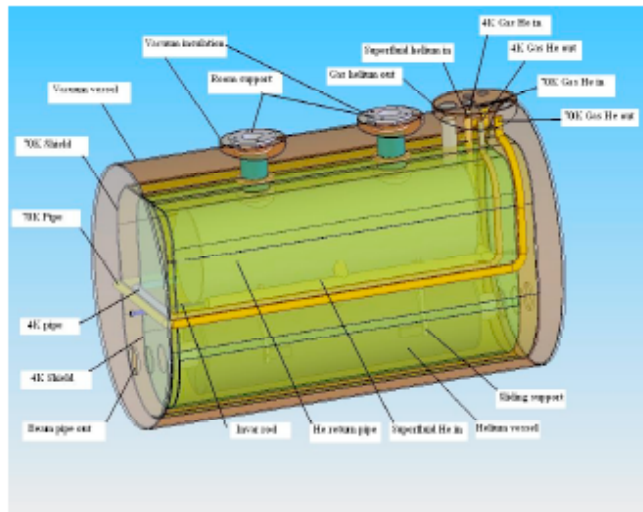


KEK new EP facility under construction

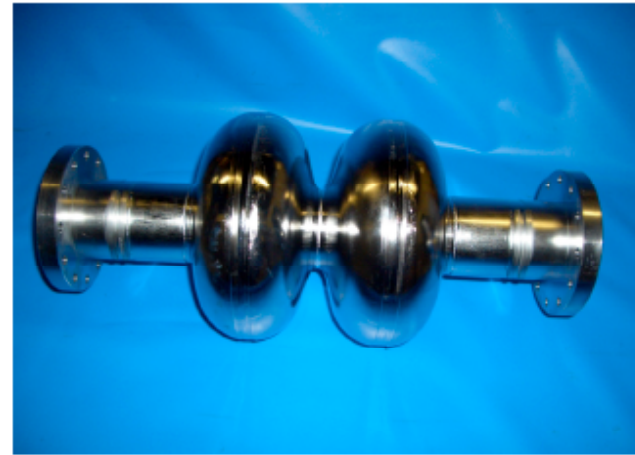
TTC China Highlights



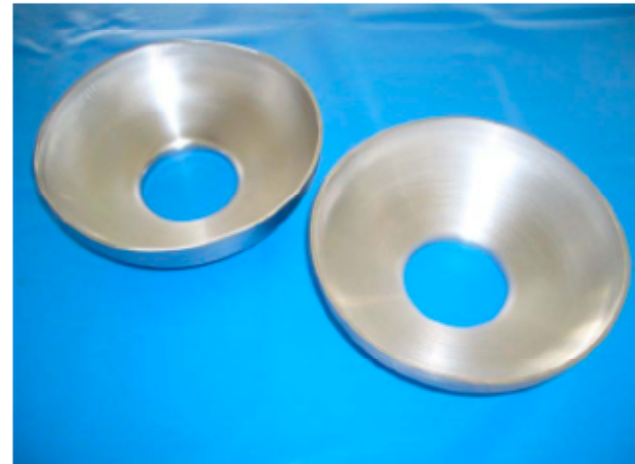
Large grain 1 cell cavities by IHEP



Design of Test cryostat for ILC 9cell cavity at IHEP



Large grain 2 cell cavities by Peking Univ.



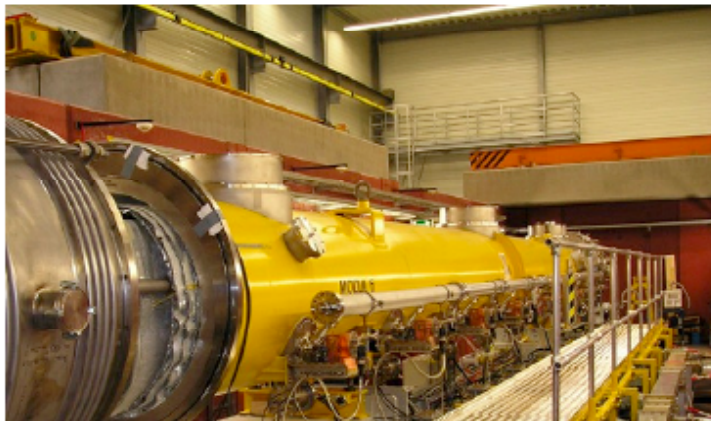
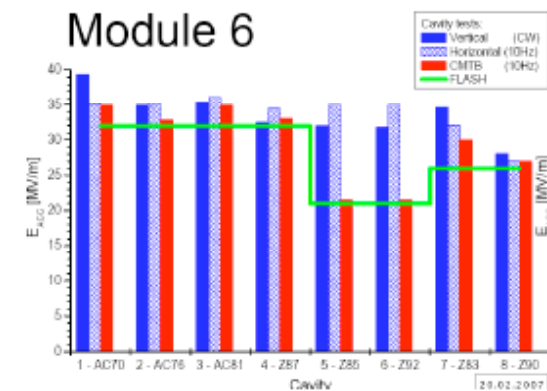
Single crystal pressed cell by Peking Univ.

EUROPE (courtesy Bernard Visentin)



Cryo-Module Test Bench Operational

(EuroFEL support)





Nine-Cell Cavity (Hydroformed)

First Seamless Cavity
(TESLA shape)

three Triple-Cell
hydroformed
at DESY



Final Steps at Zanon : flanges - stiffening rings - welding on two iris



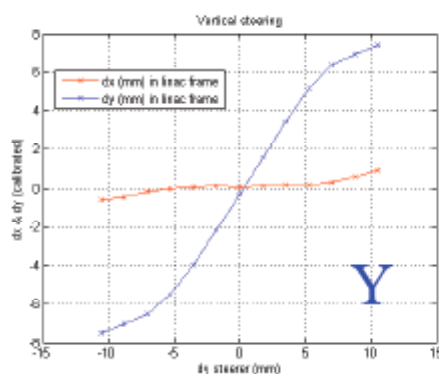
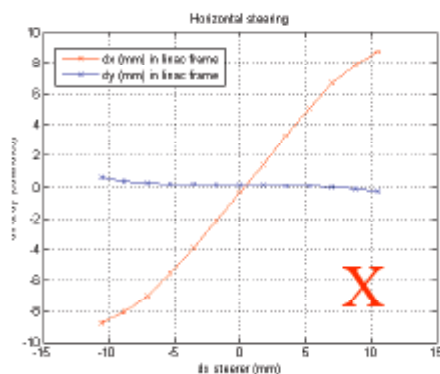
Cold Beam Position Monitor

Re-entrant Coaxial Cavity
(new design)

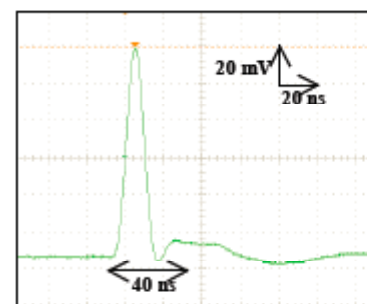
monopole \propto beam intensity



Qualified with beam
ACC7 place @ 300K



Spatial Resolution (rms)
30 μm \downarrow 8 μm (X) & 4 μm (Y)

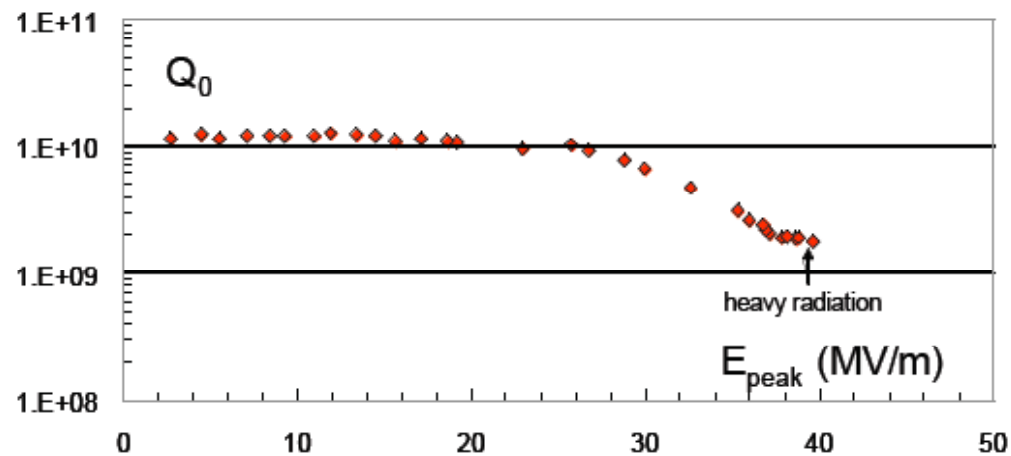
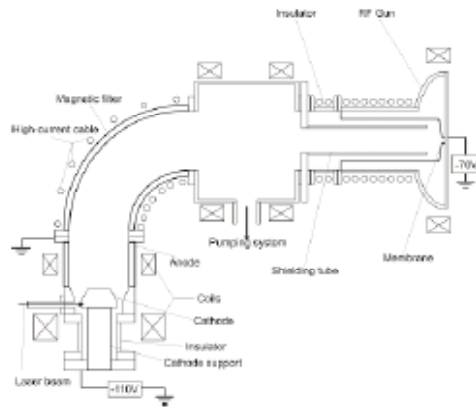


Time Resolution : (9.4 ns)
204 ns \downarrow 40 ns (cavity + electronics)



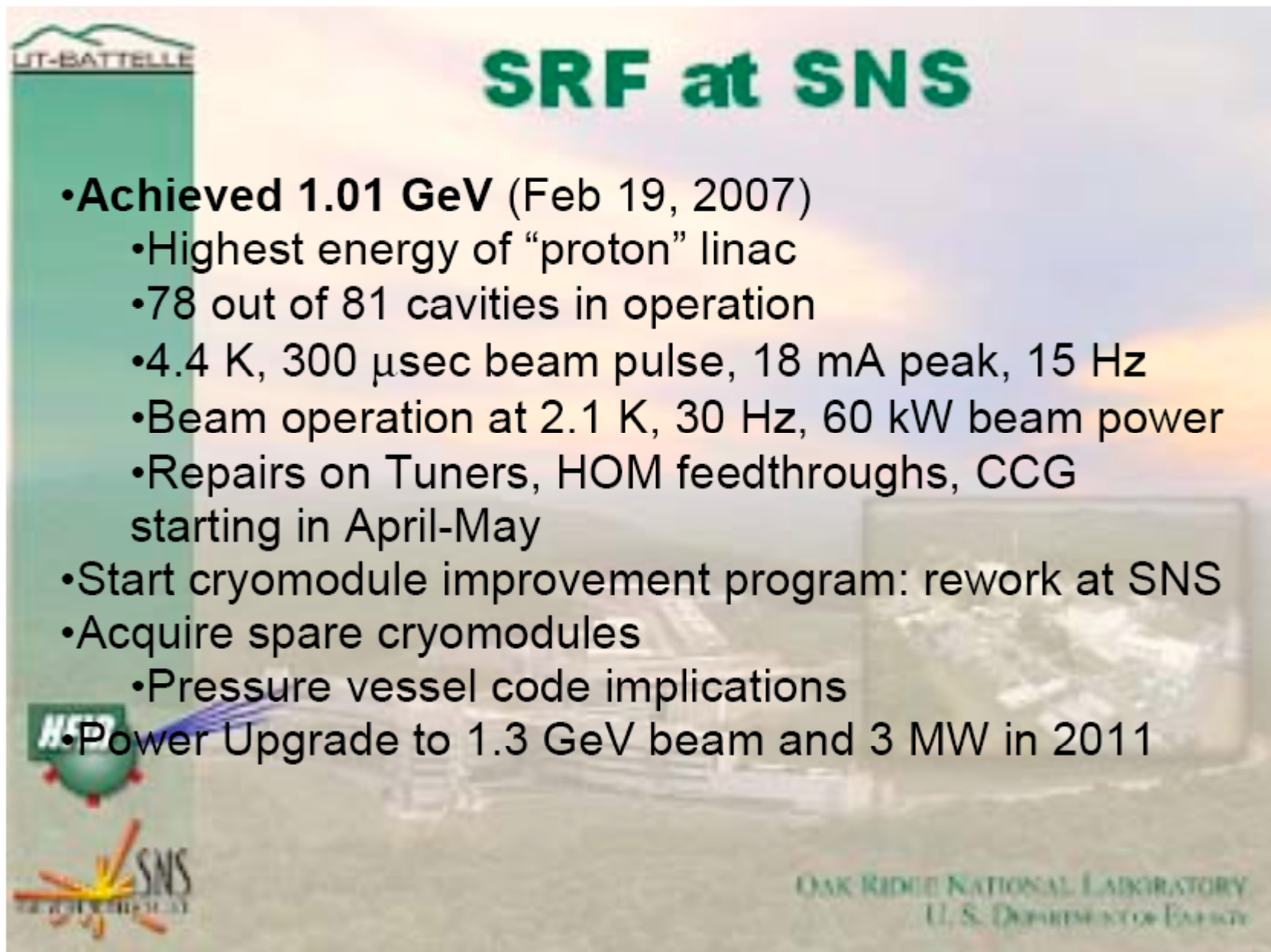
Photocathode for SC-RF Gun

SC Lead coating on Nb end-plate



improvements after new coating
test at JLab (03/2007)

AMERICAS (courtesy Hasan Padamsee)



SRF at SNS

- **Achieved 1.01 GeV** (Feb 19, 2007)
 - Highest energy of “proton” linac
 - 78 out of 81 cavities in operation
 - 4.4 K, 300 μ sec beam pulse, 18 mA peak, 15 Hz
 - Beam operation at 2.1 K, 30 Hz, 60 kW beam power
 - Repairs on Tuners, HOM feedthroughs, CCG starting in April-May
- Start cryomodule improvement program: rework at SNS
- Acquire spare cryomodules
 - Pressure vessel code implications
- Power Upgrade to 1.3 GeV beam and 3 MW in 2011

UT-BATTELLE

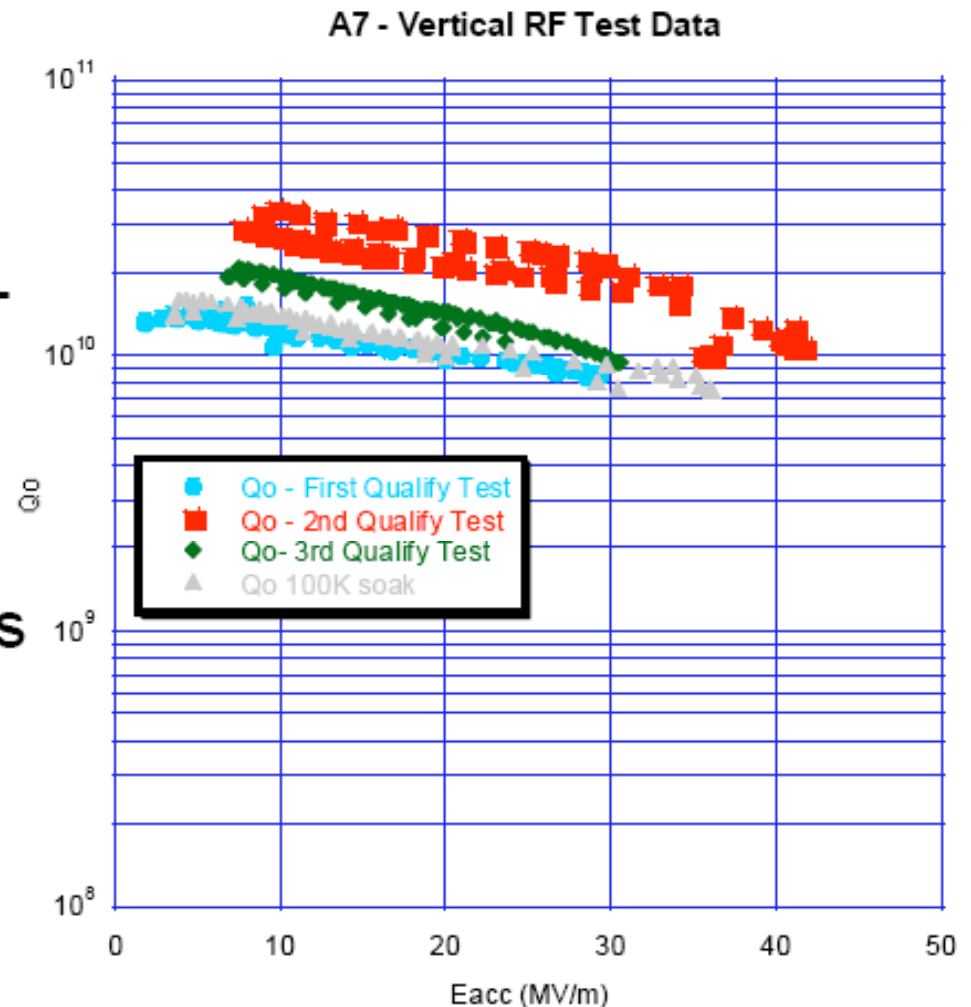
HF

SNS

OAK RIDGE NATIONAL LABORATORY
U. S. DEPARTMENT OF ENERGY

JLAB

- 9-Cell ILC cavity preparation and test program well underway
- Two cavities from ACCEL tested several times
 - No field emission
 - Best Eacc:
 - 38, 42 MV/m (record)
- Testing started on cavities from new vendor :AES (Medford, NY)



JLAB

- Jlab Fabrication of 1 fine grain and 2 large grain 9-cell cavities complete



Fermilab

- Vertical test set up nearing completion
- Horizontal test cryostat commissioned
 - RF power ready, cryogenics ready
- Capture cavity/cryostat from DESY re-assembled and tested (31 MV/m)
- Cavity string and Cryomodule assembly facilities far along
 - Clean room commissioned
 - Assembly fixtures delivered

Fermilab



Horizontal Test Cryostat at FNAL
Commissioned



Operated at
31 MV/M

DESY Capture
Cavity at FNAL



Parts for new Cryomodule
Assembly fixture in IB4

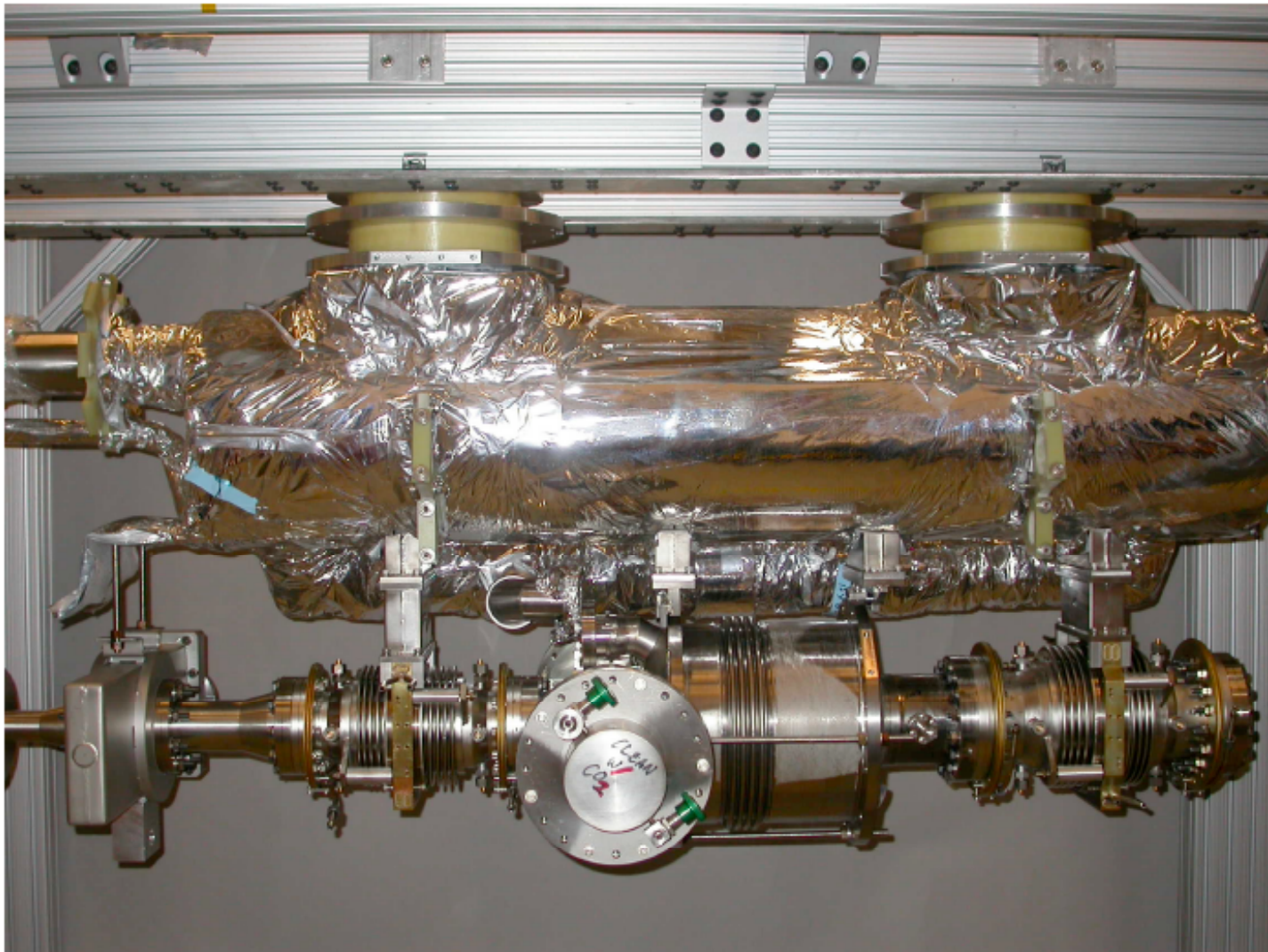


CAF-MP9
Large Class-100 clean room
Installed & Passed certification

Cornell

- ERL injector crymodule program
 - Six 2-cell cavities complete, 4 tested, $E_{acc} > 20$ MV/m
 - Two prototype high power couplers delivered by CPI, tested to 75 kW CW
 - Two prototype HOM couplers complete
 - Six INFN blade tuners complete
 - One-cavity test module nearing completion
- Vertical electropolishing moves forward :
 - $E_{acc} = 30$ MV/m
- Small aperture re-entrant cavity record gradient
 - 58 MV/m
- 9-cell re-entrant cavity delivered

Cornell - One-Cavity Test Module



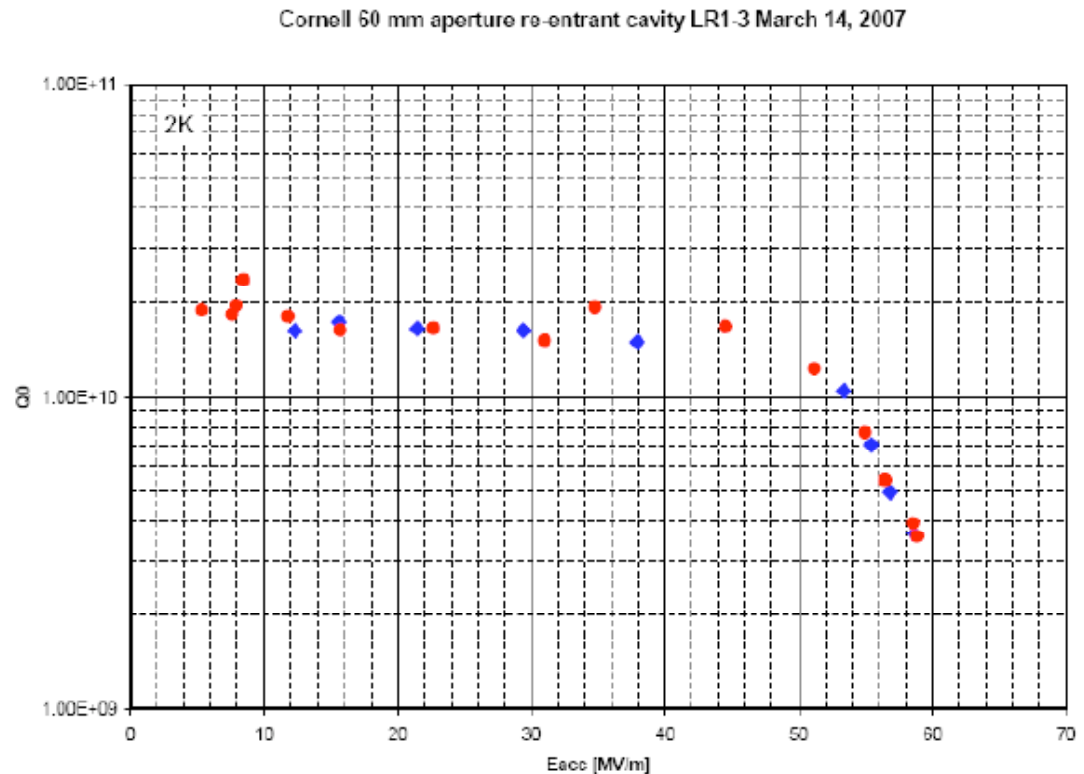
Cornell/KEK Collaboration

60mm-Aperture Re-Entrant Cavity

Best $E_{acc} = 59 \text{ MV/m}$



RE-LR1-3



- Much progress AROUND THE WORLD in the past 6 months
- We'll learn the *details* at this meeting and make *plans* for going forward together for even more progress in the next 6 months in
 - materials
 - processes
 - applications
- ***MANY THANKS TO OUR HOSTS FOR MAKING THIS MEETING POSSIBLE !***