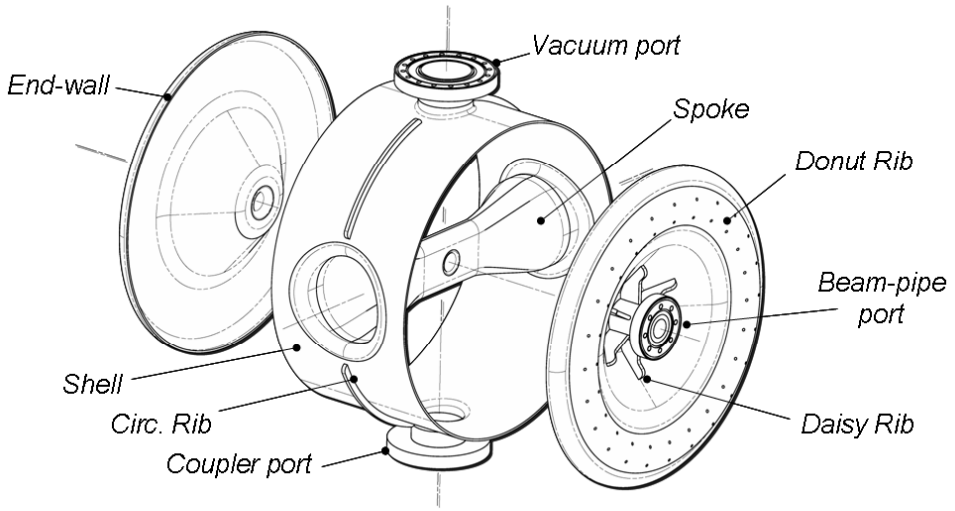
Status of SSR1-01 (Zanon) and SSR1-02 (Roark)

Quantity	Value
Operating temperature	4.4 K
Accelerating gradient, E_{acc}	10 MV/m
Q_0 at accelerating gradient	$> 0.5 \times 10^9$
Beam pipe, Shell ID	30 mm, 492 mm
Lorenz force detuning coefficient	3.8 Hz/(MV/m)^2 (with He vessel)
E_{peak}/E_{acc} *	3.86
B_{peak}/E_{acc} *	6.25 mT/(MV/m)
G	84 Ω
R/Q_0	242 Ω
Geometrical Beta, β_g	0.21

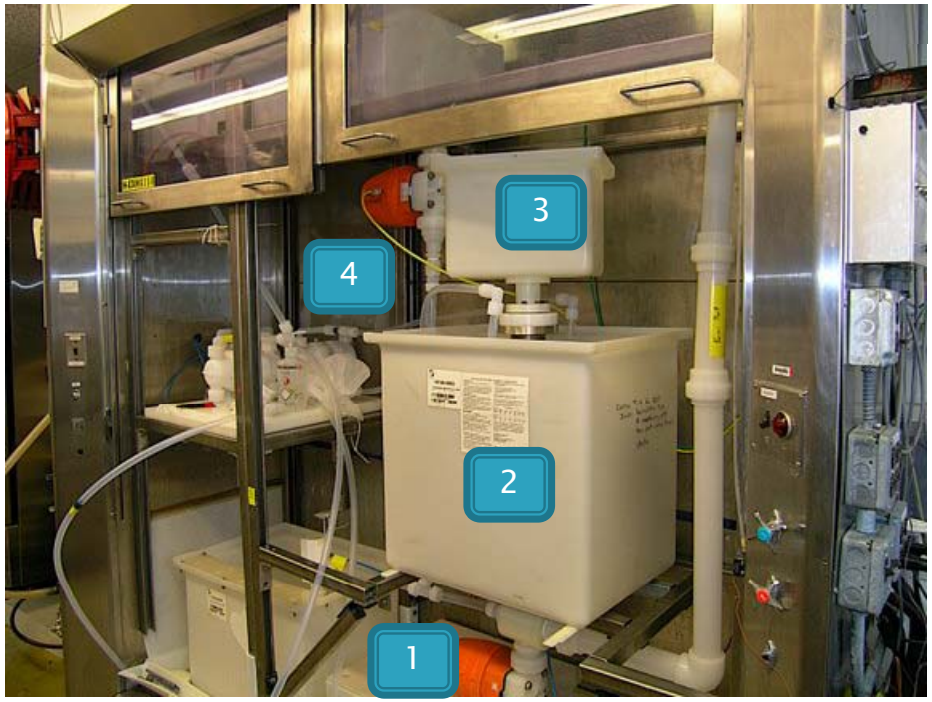
SSR1-02, the 2nd SSR1 prototype. Fabricated by Roark.



- * Two main criteria of the RF design were to minimize these ratios.

Buffered Chemical Polishing (BCP) of SSR1-02 at the ANL G150 facility (1-09)

- BCP with standard $HF:HNO_3:H_3PO_4$ 1:1:2 acid mix.
- Etch in two sessions of 70 and 80 minutes. Between sessions:
  - Flip cavity top to bottom
  - Replace spent acid with fresh (Nb <10g/l)
- Acid temperature averaged 16.2 °C for 1st session and 12.6 °C. for second.
- Acid injected more uniformly (beampipes AND near coupler ports)
- Wall thickness measurements were unreliable in many spots. Where consistent, reductions ranged from 80 to 130 microns, except at the coupler ports, which again were light at ~60 microns.



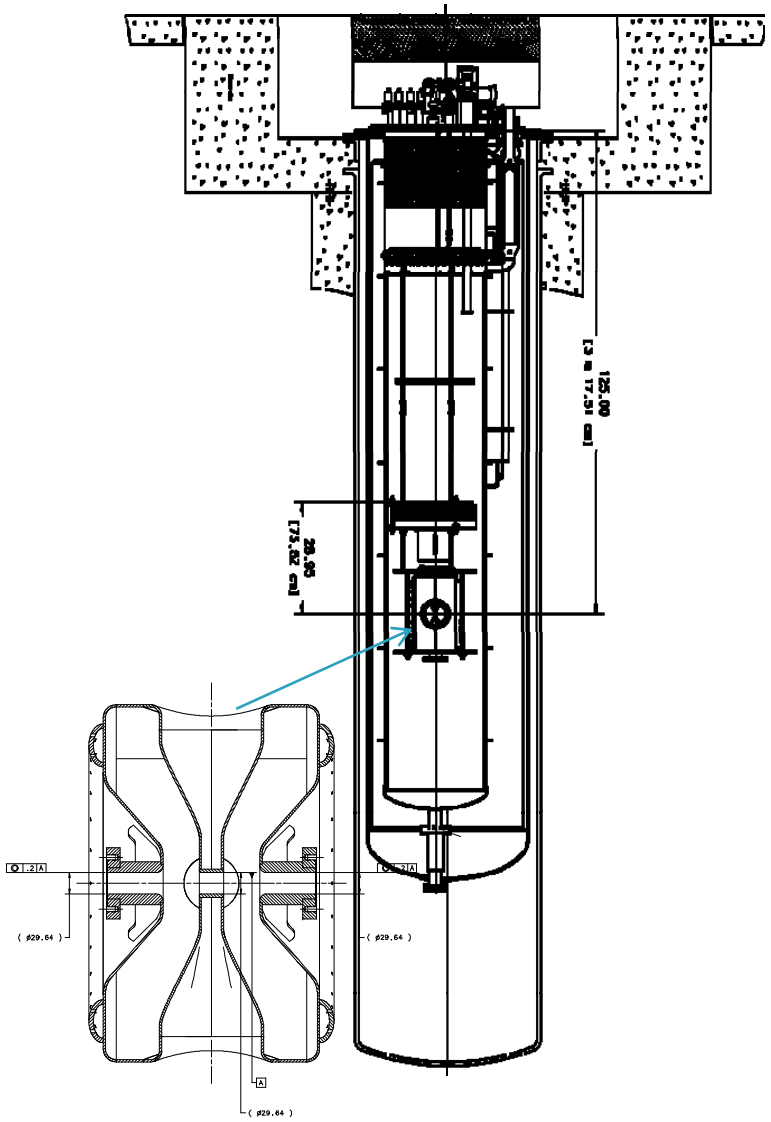
1. Acid fill valve (acid fills through vacuum or power port)
2. Chilled water tank (controls acid temp during etch)
3. Acid overflow bucket (cavity completely filled with acid)
4. Closed loop acid circulation during etching
   - Pump from overflow bucket into both beam pipes.

HPR of SSR1-02 at G150 facility (SSR1-01 shown in picture) (1-09)

- Long wand: nozzle at end with 6 ultra-pure water jets, two each at +45°, 90°, and -45° to wand axis.
- Wand rapidly rotates about its axis and travels along its axis (into or out of the cavity) at ~ 1 inch/min.
- In order to minimize personnel incursions in the clean area, a trunion mount was used to rotate the cavity (not shown). To optimally spray, wand inserted into beampipes in both directions and into coupler ports twice. Total rinsing time increased by about 20% (to ~ 2 hours).
- Cavity left in a good orientation for drainage (vacuum port up) and left to dry in Class 10 area for several days.
- Flanges blanked off and cavity sent to MP9
- With Leonardo and Damon: made measurements and have tentative scheme for BCP and HPR of ~400 lb jacketed cavity.

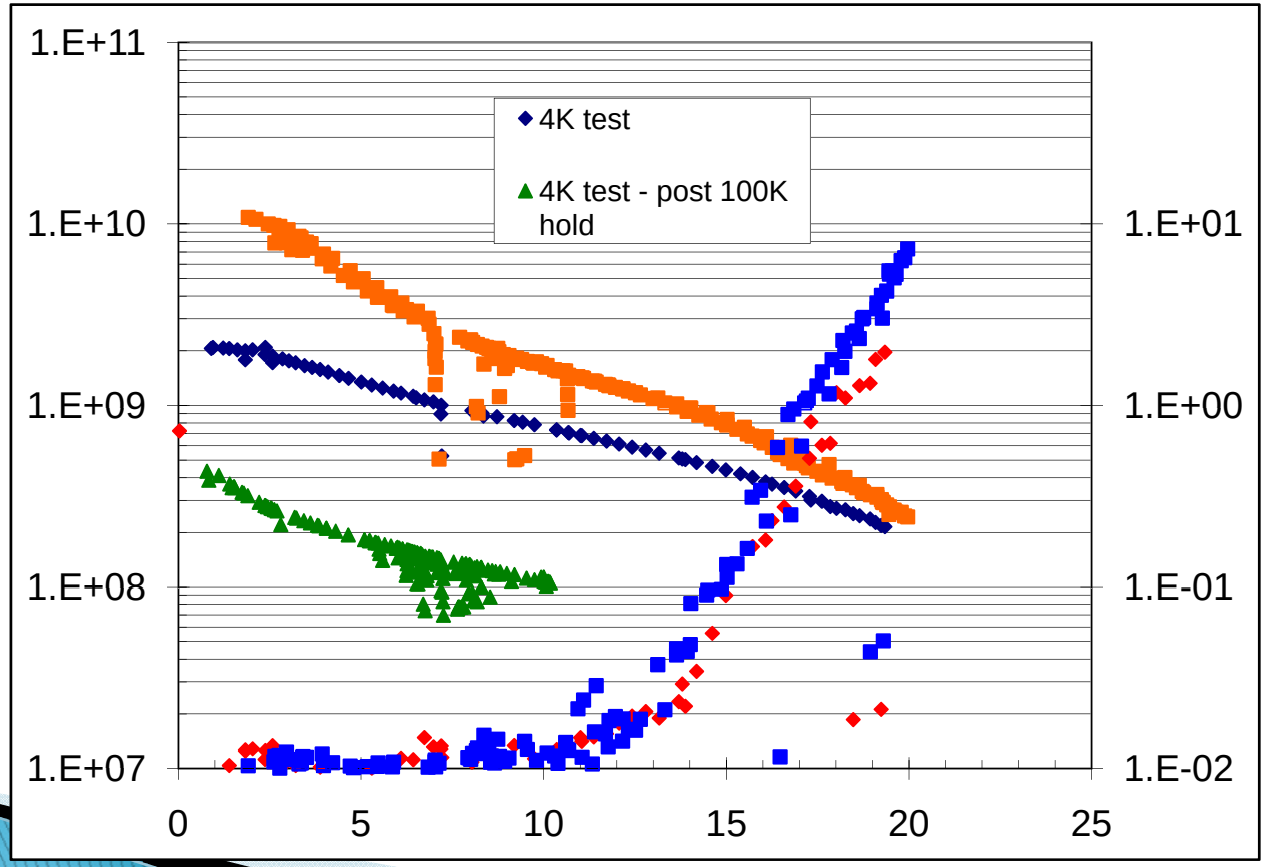
SSR1-01 in VTS – Modified antenna flanges (one RF feedthrough leaked, ending test in 7-08)

- Stand reconfiguration. Thu 1/15/09 to Fri 1/16/09.
  - -- IB1 personnel.
- Test Preparation. Tue 1/20/09 to Thu 1/22/09.
  - -- Delivery of SSR1-01 from MP9 to IB1 : MP9 and IB1 personnel.
  - -- Mount SSR1 on VTS stand: IB1 personnel.
  - -- Mount RTD temperature monitors: Dmitri
  - -- Mount x-ray photodiodes: Aseet
- Test Fri 1/23/09 to Thu 1/29/09
  - -- Q0 .vs. E at 4K and 2K: Joe, Timergali, Dmitri, Aseet
  - -- Warm up and slow cooldown (7 hr hold at 100K) to 4K
  - -- Q0 .vs. E at 4K to test for Q disease.
- Warm up, dismount, send to MP9. Thu 1/29/09 to Fri 1/30/09
  - -- IB1 and MP9 personnel.



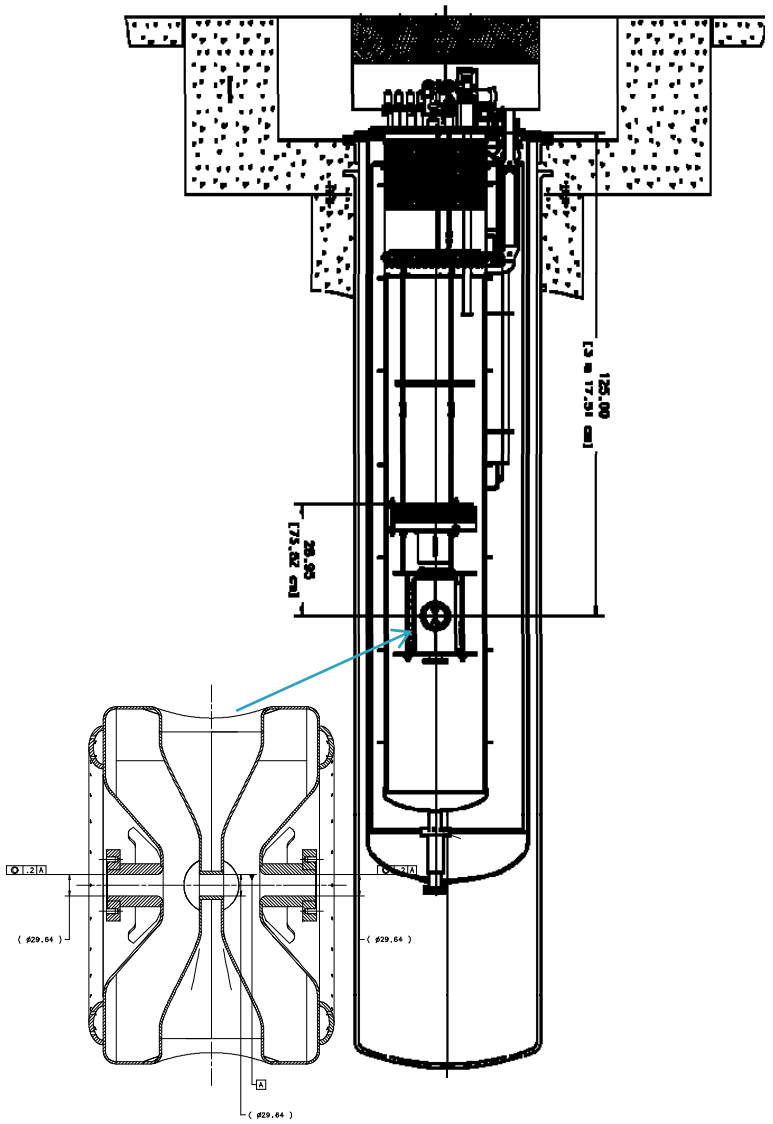
Latest SSR1-01 VTS Test

- VTS Test Fri 1/23/09 to Thu 1/29/09
  - -- Q0 .vs. E at 4K and 2K: Joe, Timergali, Dmitri, Aseet, Bob
  - -- Warm up and slow cooldown (~7 hr hold at 100K) to 4K.
  - -- Q0 .vs. E at 4K to test for Q disease.



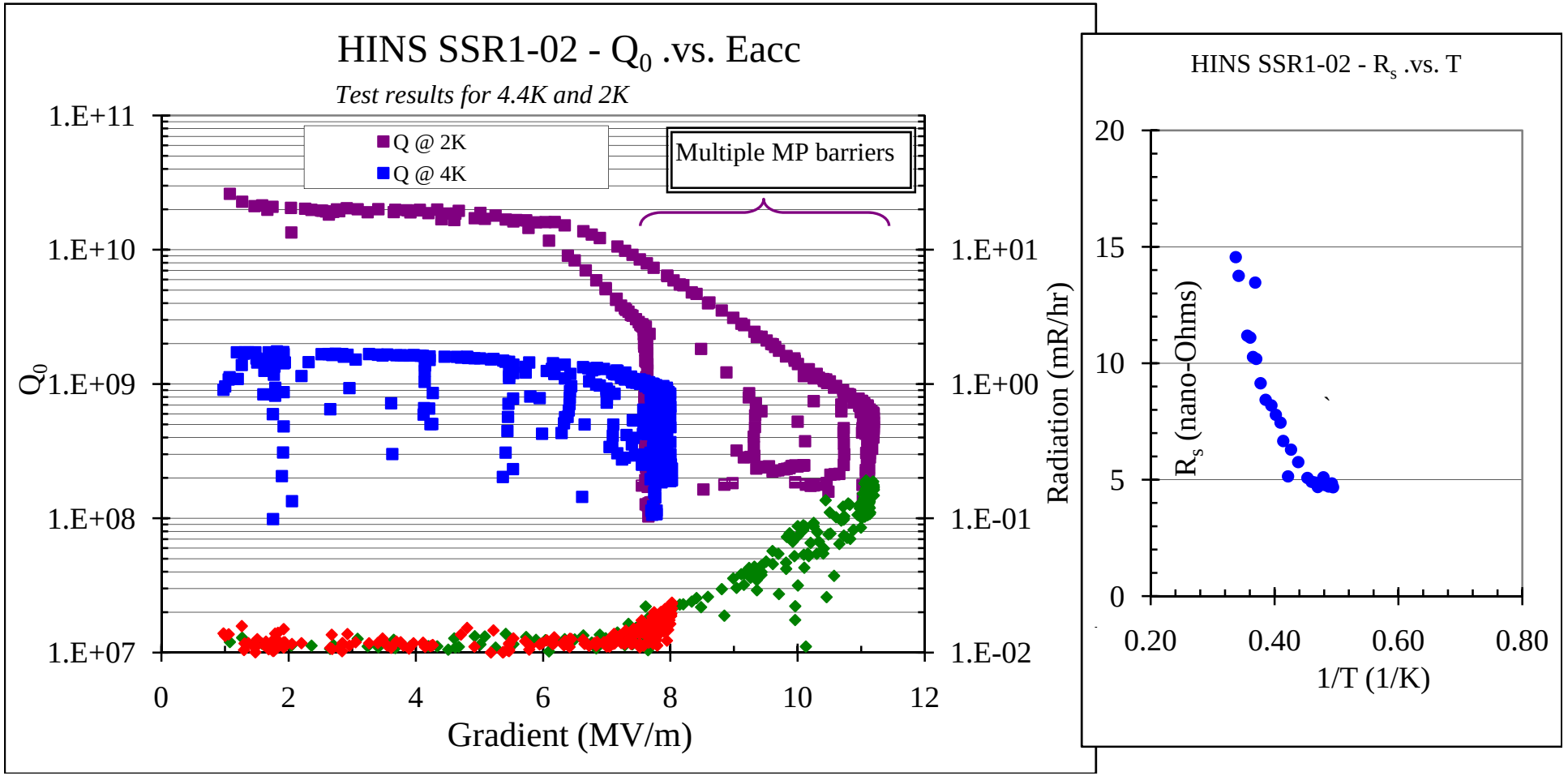
SSR1-02: First cooldown & VTS Test

- VTS hardware attachment, pump down, leak check. Done 2/23//09.
  - -- MP9 personnel
- Stand reconfiguration. 2/23/09
  - -- IB1 personnel
- Test Preparation. 2/23/09 to 2/25/09.
  - -- Delivery of SSR1-02 from MP9 to IB1: MP9 and IB1 personnel.
  - -- Mount SSR1 on VTS stand: IB1 personnel.
  - -- Mount RTD temperature monitors: Dmitri
  - -- Mount x-ray photodiodes: Aseet.
- Test. 2/26/09 to 3/2/09.
  - -- Q0 .vs. E at 4K and 2K: Joe, Timergali, Dmitri, Aseet
- Warm-up, dismount, send to MP9. 3/2/09 to 3/3/09
  - -- IB1 and MP9 personnel.



SSR1-02 VTS Test (ongoing)

- Test. 2/26/09 to 3/2/09.
  - -- Q0 .vs. E at 4K and 2K, Q0 .vs. T for Rs
  - -- At 4K, stopped at 7.6 MV/m MP barrier (low LHe level).
  - -- At 2K, Eacc to 11.2 MV/m, fighting MP barrier.
  - -- Q0 .vs. E to ~6 MV/m essentially identical to SSR1-01 at first cooldown (no effects of Q disease).
  - -- Today, scan at 4K – Try to process 11.2 barrier?



SSR1-01 Schedule issues

- Machine flanges to accept modified helium vessel. 2/09
- 10 hr., 600C vacuum bake (hydrogen degassing) at Jlab. 3/09
- Inelastic tune adjust and measurement of endwall spring constant. 3/09
- Weld on the stainless steel helium vessel. (TIG welding at Fermilab). 4/09
- Light (~25 micron) BCP and HPR at Argonne G150. 4/09
- Install in Test Cryostat (TC) at Meson 5/09 – 6/09
- CW and Pulsed (Klystron) tests at 4.4K using the Test Cryostat. 7/09

•CW Measurements

• Resonant frequency and pressure dependence with the helium vessel.
• Lorentz Force detuning (LFD) coefficient.
•Q0 .vs. Eacc (Q disease cured?)
• Yuriy is designing a piezoelectric actuator with "button" strain gauge. Measure force on actuator during cool down (seats on ID similar to 9-cell).

•Pulsed Measurements

• Will fast (~1ms) pulse just push through multipacting barriers?
• What is the LFD at 10 MV/m with Project X pulse structure?
• Attempt to compensate for LFD and pressure variations with piezoelectric actuator (ala CC2).
• Attempt High power Pulsed Processing of field emitters.

SSR1-02 Schedule issues

- After VTS test: warm-up, dismount, send to MP9. 3/2/09 to 3/4/09
  - -- IB1 and MP9 personnel.
- 600C vacuum bake (Hydrogen degassing).- ANL 4/09.
- Inelastic tune adjust and measurement of endwall spring constant. 5/09
- Weld on the stainless steel helium vessel. 6/09
- Light (~25 micron) BCP and HPR at Argonne G150. 7/09
- CW and pulsed (Klystron) tests using the Test Cryostat. 8/09

SSR1-03,04 Schedule issues (very uncertain)

- Deliver electropolished (?) cavities. 6/09 or 7/09
- Light (~25 micron) BCP and HPR at Argonne G150. 8/09
- VTS test. 9/09