Update on S0 Work in the Americas Region

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Many additional people did the work…

Cornell SRF Technical Progress Since March 2009

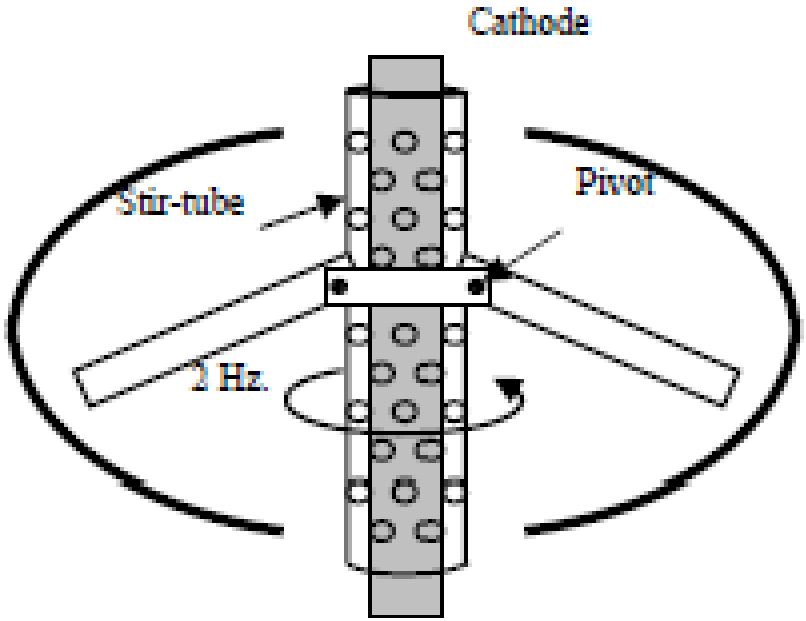
CLASSE SRF Group

Cornell University

Laboratory for Elementary-Particle Physics

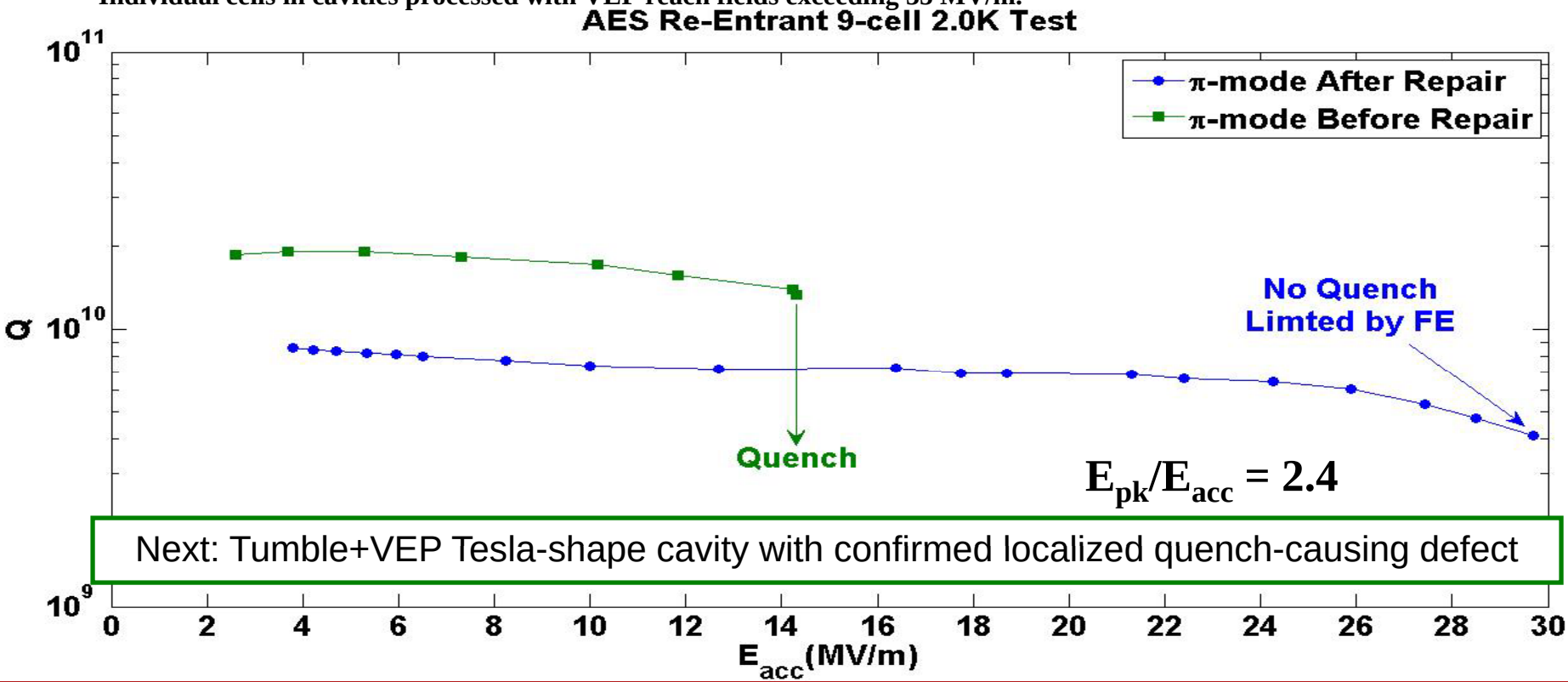
Vertical Electropolish Proven Effective

- We have demonstrated gradients >35 MV/m in individual cells of two 9-cell cavities processed with vertical EP.
- In each test the π-mode was limited by quench or FE.



AES Re-Entrant 9-Cell Cavity Weld Pits Repaired

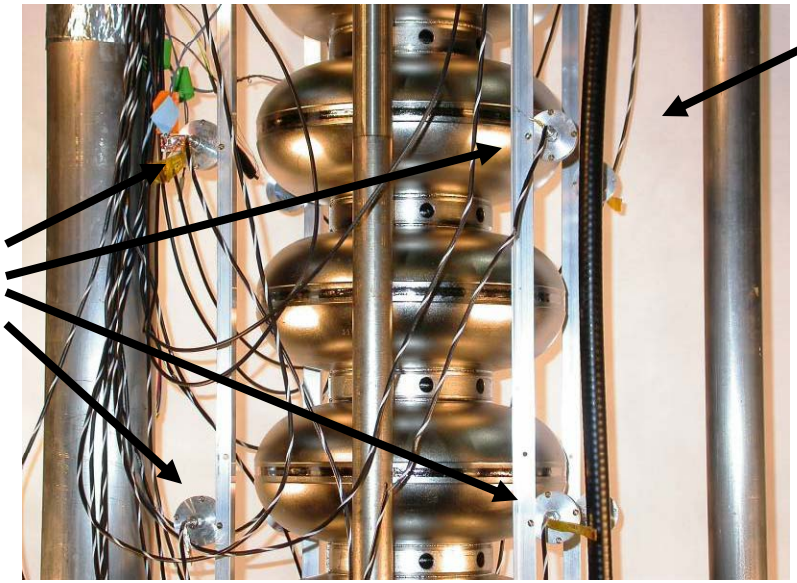
- **We have successfully repaired an AES re-entrant 9-cell cavity with tumbling and VEP.**
- **This cavity originally quenched at E_{acc} = 15 MV/m in the π-mode at a weld pit in the first cell, after tumbling and reprocessing the π-mode E_{acc} > 30MV/m. The measurement was limited by the available RF power the cavity did not quench.**
- **When excited in the 5π/9-mode peak fields of 89 MV/m and 1400 Oe were reached in the center cell. This corresponds to E_{acc} = 37 MV/m in the center cell.**
- **This test demonstrates that**
  - **Tumbling is an effective option to repair weld defects, e.g., pits.**
  - **Individual cells in cavities processed with VEP reach fields exceeding 35 MV/m.**



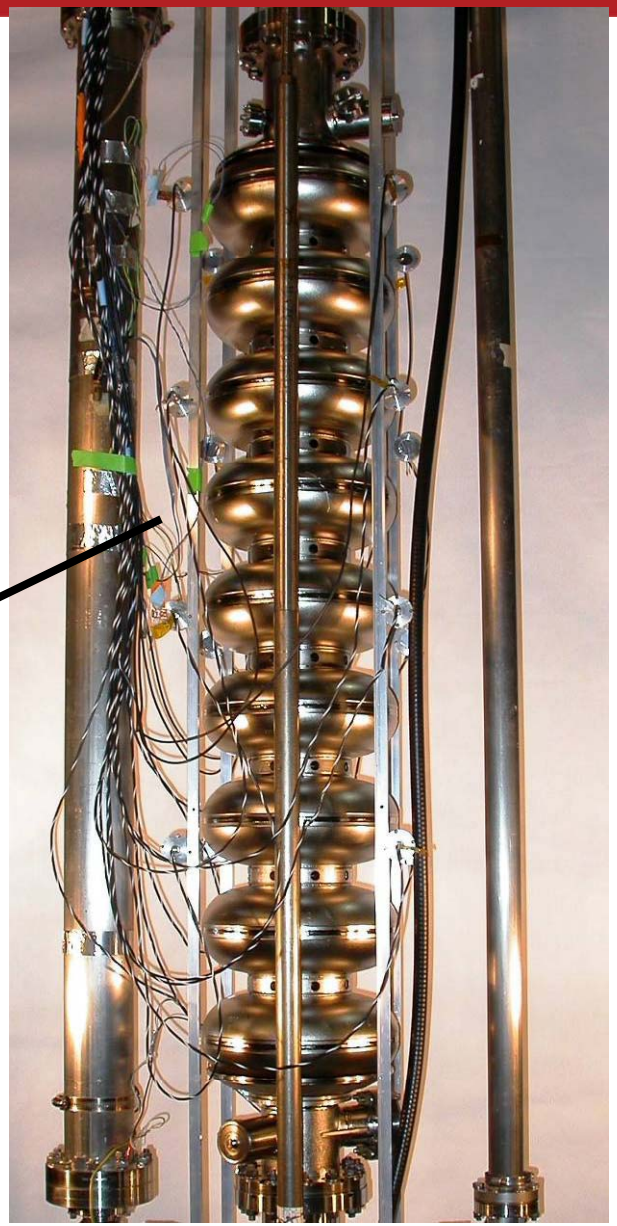
Next: Tumble+VEP Tesla-shape cavity with confirmed localized quench-causing defect

2nd Sound Quench Detection

- **We have demonstrated that 2nd sound detection can locate multiple quench locations in a single 9-cell cavity cold test**
- **By exciting different TM_{010} pass-band modes of a 9-cell cavity different cells can be driven to quench.**
- **This technique is simple, low cost, and quick to implement. In the test pictured here we found 3 distinct defects: 1st cell (from top), 4th cell, and 5th cell.**



Four Of The Transducers



Progress at Jefferson Lab … since April TILC09

Fermilab

- **Assisted Fermilab with first process/test (almost-)fully FNAL/ANL cavity TB9ACC017**
  - **600C furnace treatment**
  - **Tuning and field-flatness measurement**
- **TB9AES006 process/test**
  - **Reached 14.1 MV/m limited by hard quench upon first pass**
  - **Pass-band mode measurements show center cell (cell#5) limiting**
  - **All other cells reached cell gradient in range 32.4 - 41.4 MV/m**
  - **T-mapping identified hot spot near the equator of cell#5 correlated to quench**
  - **Twin defects (one ~ 300 um and other ~500um) were discovered at the hot spot location using Questar optical inspection**

Next: Full process/test of two new cavities, one AES and one ACCEL/RI

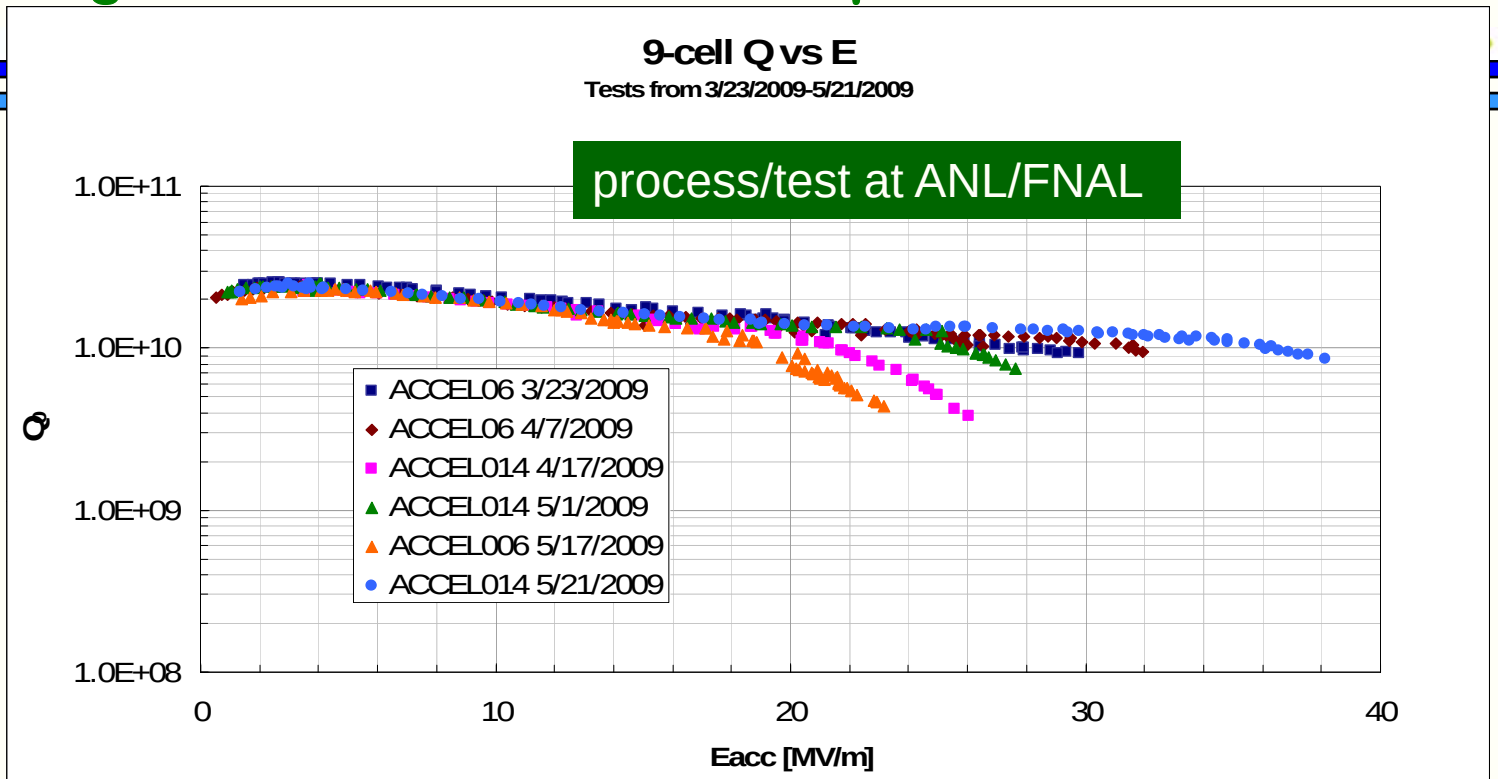
Progress at FNAL/ANL … since April TILC09

Fermilab

- **TB9ACC017**
  - Bulk EP (150 um)
  - Ultrasonic degreasing and HPR
  - Sent to JLab for hydrogen degassing and tuning (see previous slide)
  - Currently on optical-inspection (KEK-Kyoto system) bench – ~1mm Ø iris pit
  - Light EP this month
  - Test this month – try to squeeze before 2-month shutdown for VTS2&3 civil construction

- **FNAL/ANL facility status**
  - HPR water pump problem
  - After HPR pump, but before wand, filter looks brown: pump may be leaking oil
  - Restart work with 1-cell in 1-2 weeks unless new pump needed, then 3-4 weeks for pump and installation
  - Then restart 9-cell program if good 1-cell result

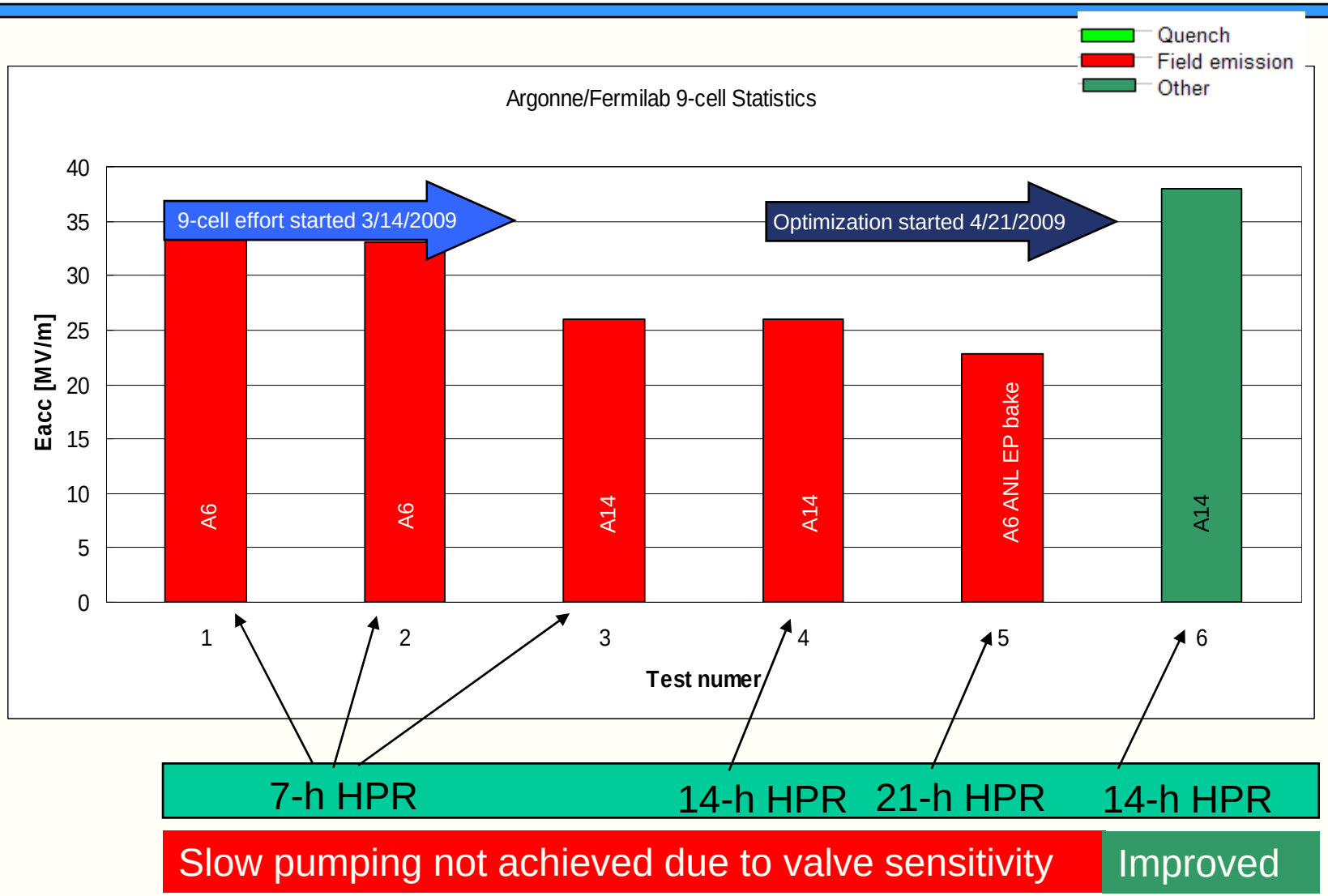
Progress at FNAL/ANL … since April TILC09



Date	9-cell	Proc/ test #	Max Eacc [MV/m]	Limit	Processing note
2009-03-23	A6	1	30.0	FE and RF system	USR&HPR
2009-04-07	A6	2	31.9	FE and RF system	USR&HPR
2009-04-17	A14	3	26.0	FE and RF system	USR&HPR
2009-05-01	A14	4	25.7	FE and quench	USR&HPR
2009-05-11	A6	5	23.2	FE and RF system	light EP, USR&HPR, 120C bake
2009-05-21	A14	6	38.1	RF system (FE present)	USR&HPR

Process/test previously shown excellent for 1-cells; field emission for 9-cells greatly reduced in last test

Progress at FNAL/ANL … since April TILC09



Americas Summary for ILC/S0 baseline cavities

Fermilab