

JLab Update

RG

ILC Cavity Group Meeting

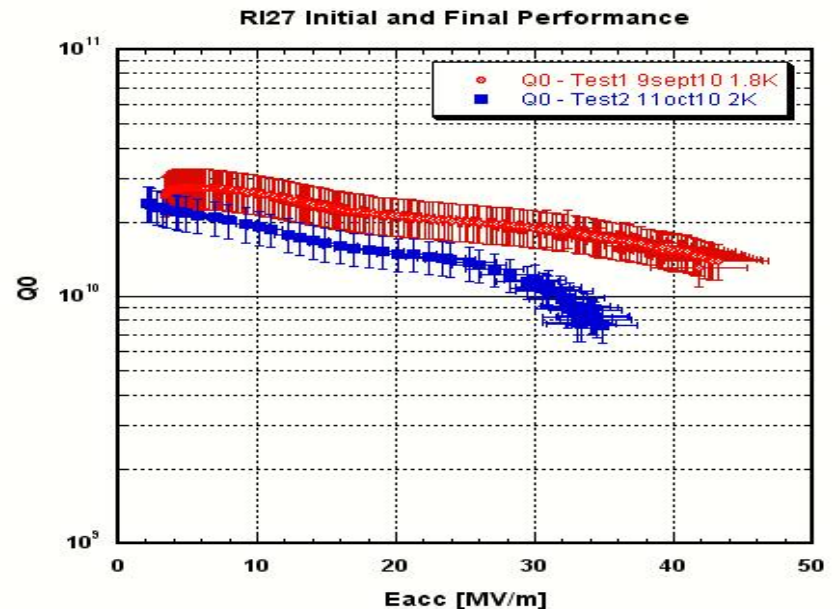
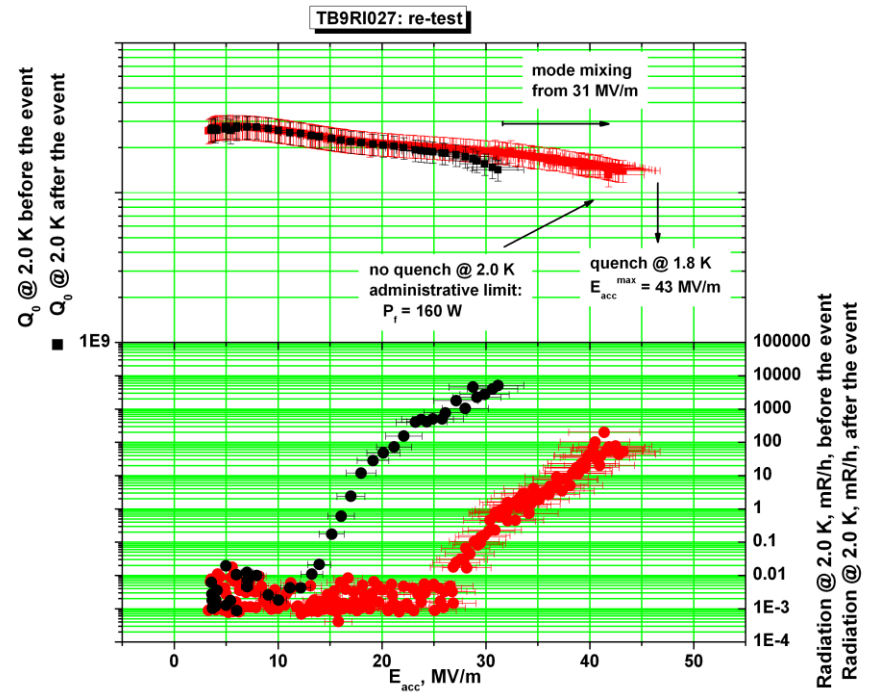
November 9, 2010

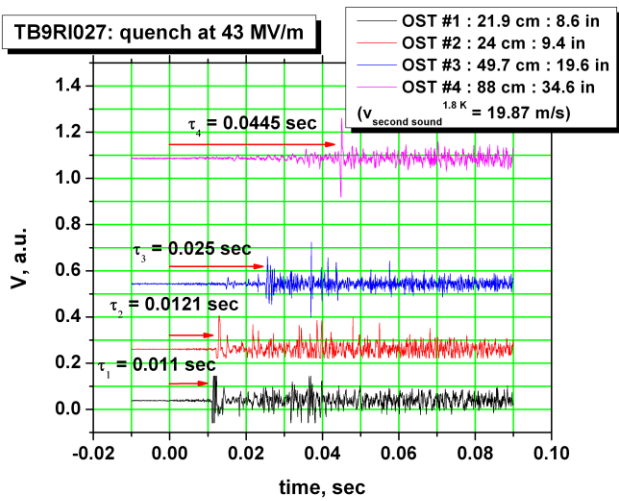
Facilities

- Facilities resumed after 2-week down in late August.
- Some field emission issues in September. Several suspected causes identified – but no strong final correlation. Situation seems to have recovered now.
- CEBAF 12 GeV upgrade cavities started EP processing and RF test and dominate work EP machine, HPR machine and class-10 assembly area.

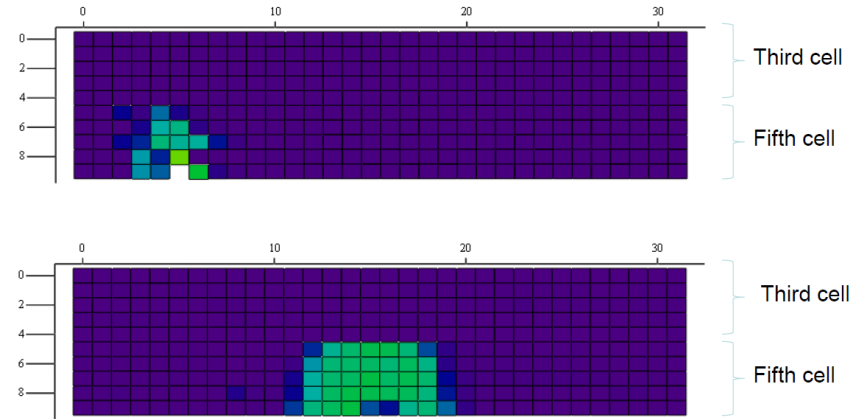
TB9RI27

- RI27 1st test 43 MV/m quench limited, < 500 mR/h X-ray at highest field, mode mixing observed at > 31 MV/m. 2nd sound predicted quench in center cell. Re-test after warm up and fixed thermometry installation – event at > 41 MV/m followed by FE turn on and limited to 31 MV/m.
- RI27 re-test after re-HPR 3X (partial dis-assm), performance recovered somewhat and meets ILC vertical test spec. still strong FE limited. Pi-mode frequency at 2K under vacuum 1299.824 MHz (target 1299.700); Pi mode FF 97.7% prior to final EP.
- Cavity already shipped back to FNAL.

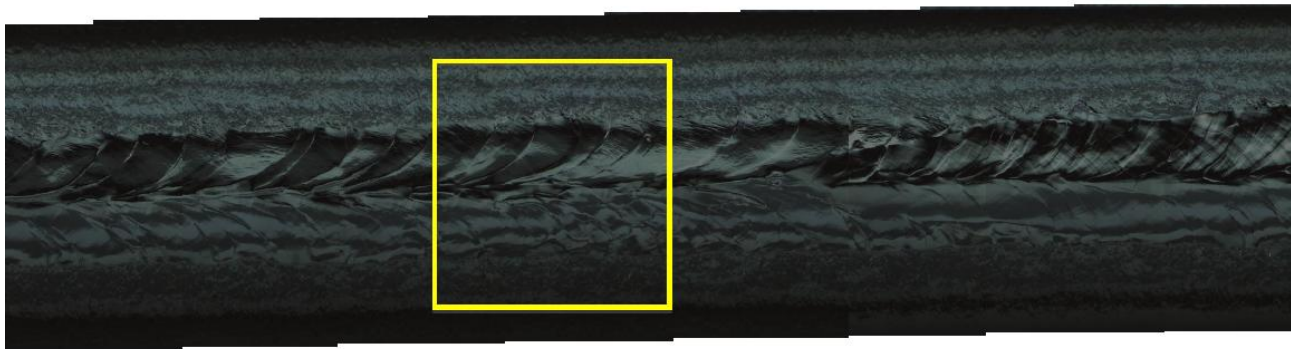




TB9RI027 : Thermometry data before and after the event



RI27 43 MV/m Quench Area

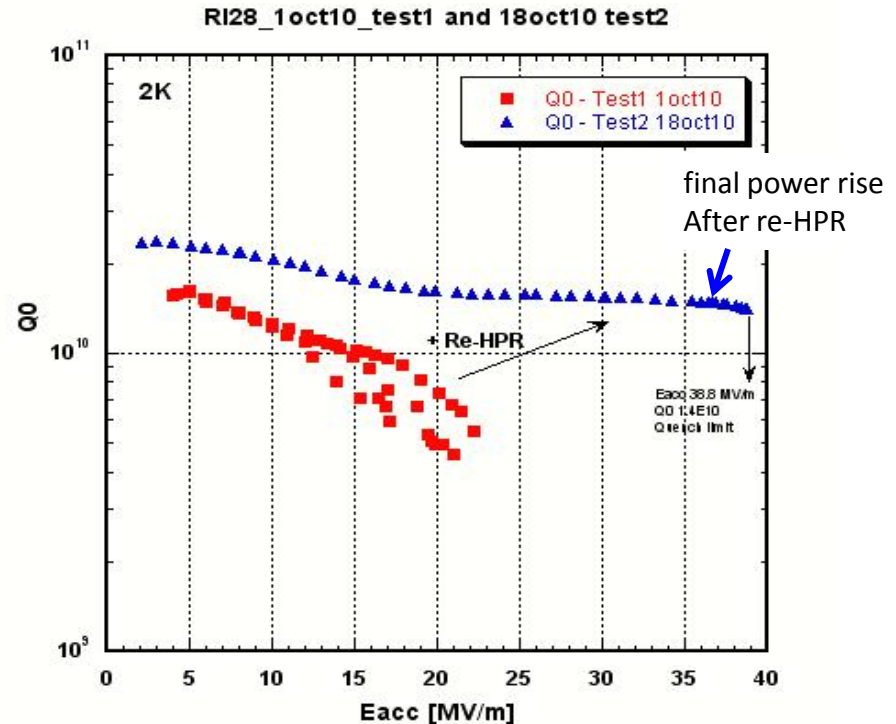
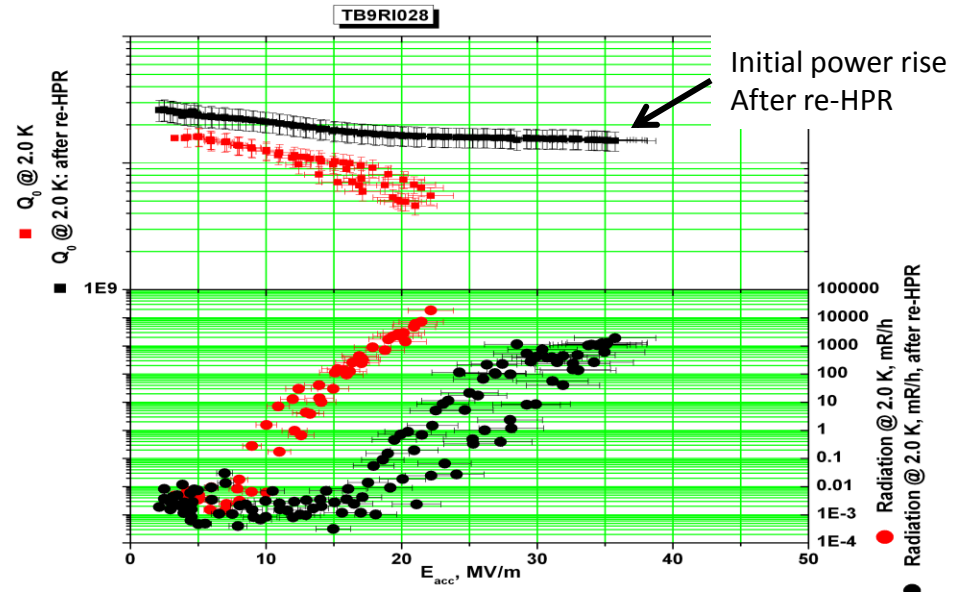


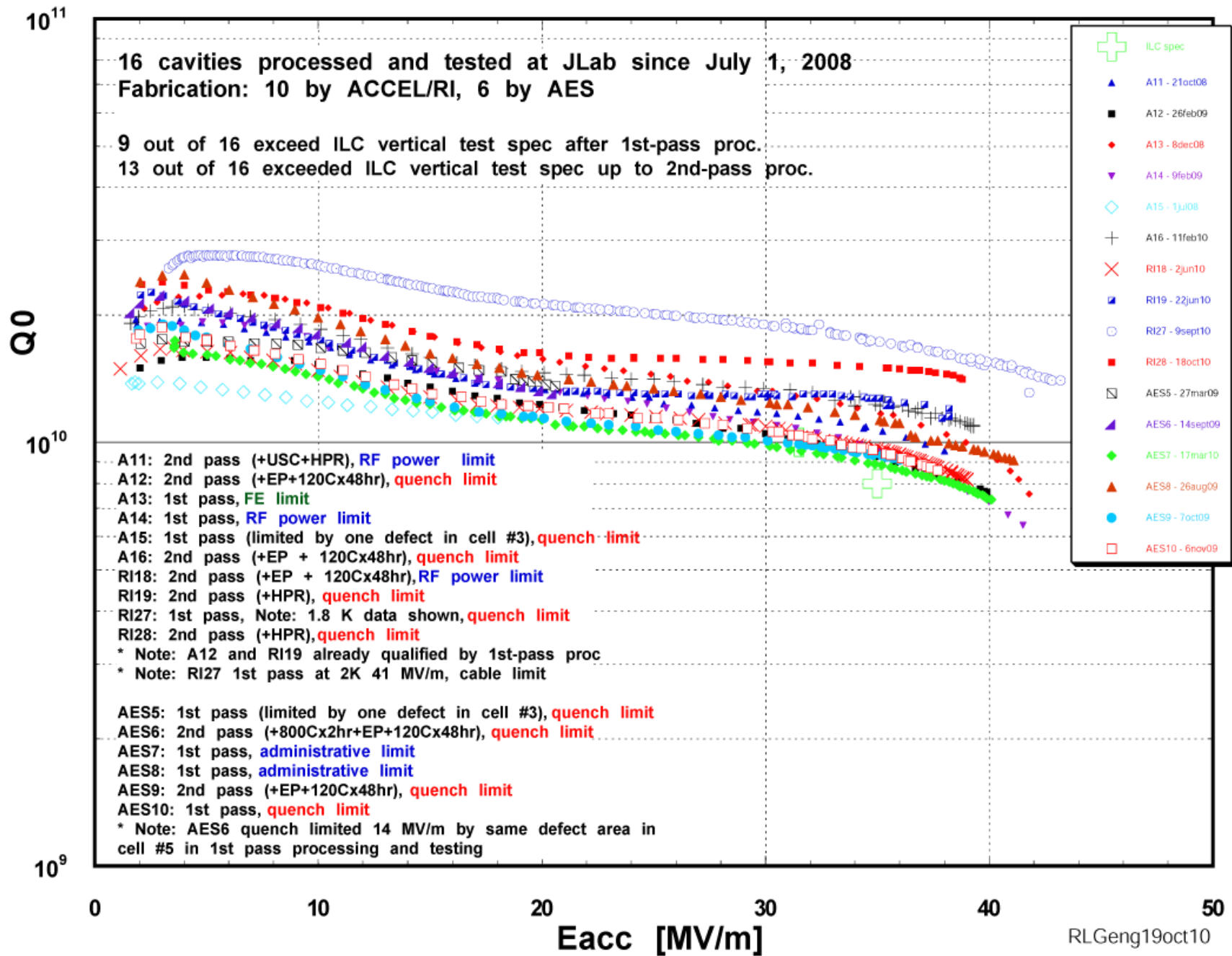
OST predicted quench area indicated by box

Quench area coincides with equator weld overlap area

TB9RI28

- Two EP runs necessary for needed bulk removal (due to removal meter issue).
- First RF test 22 MV/m, limited by strong field emission (amid temporary field emission issue related to facility).
- RI28 re-test after re-HPR 6x (complete dis-assm with hardware swap), successful FE reduction, some FE at initial power rise, almost no FE at final power rise, 38.8 MV/m at Q0 1.4E10, limited by quench. Pi mode freq 2K under vacuum 1299.854 MHz; Pi mode FF 96.5% prior to final EP.
- Cavity already shipped back to FNAL.

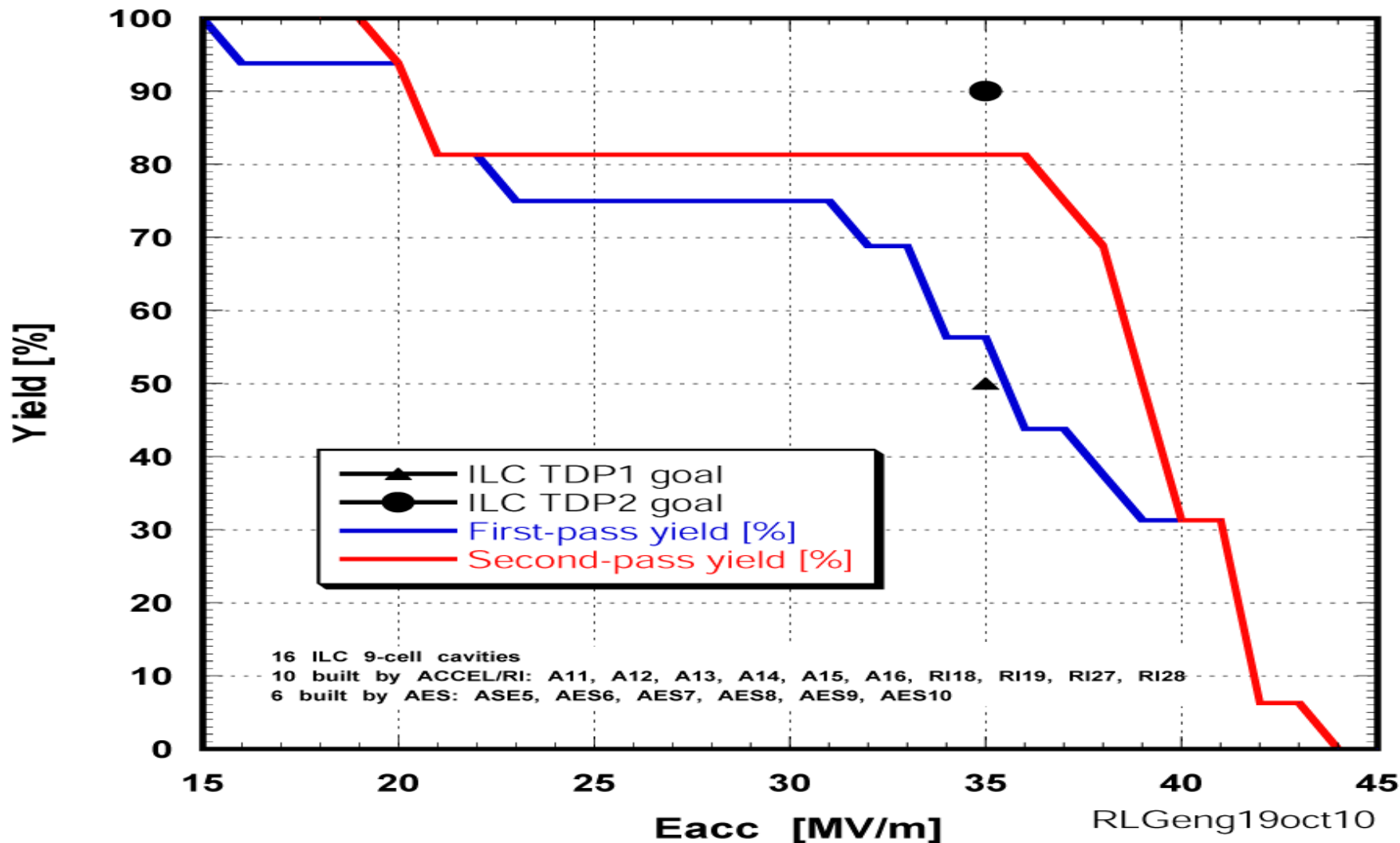




Gradient yield curve

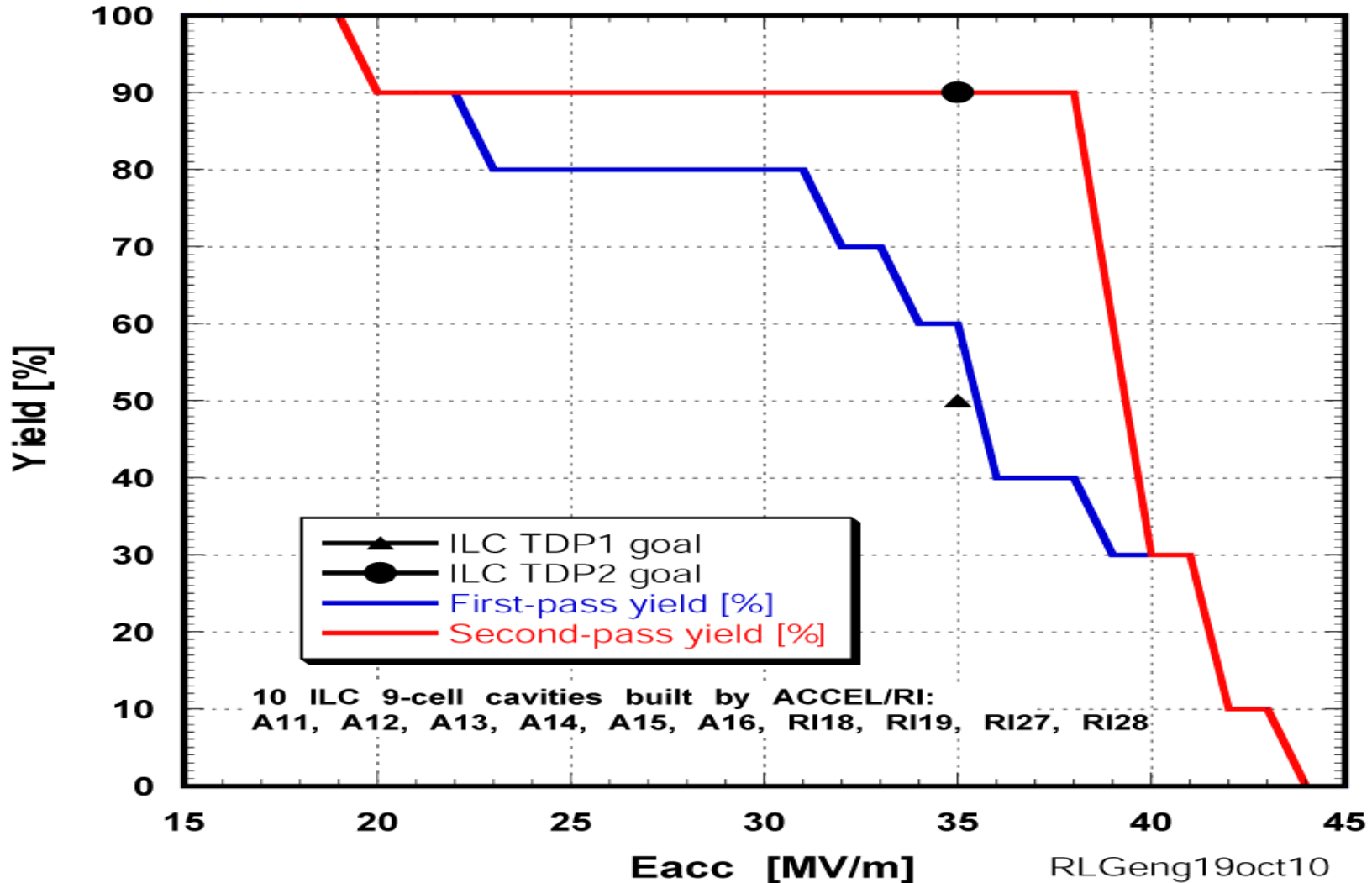
ACCEL/RI and AES cavities without bias

**Gradient Yield of 16 ILC Cavities
Processed and Tested at JLab since July 2008**



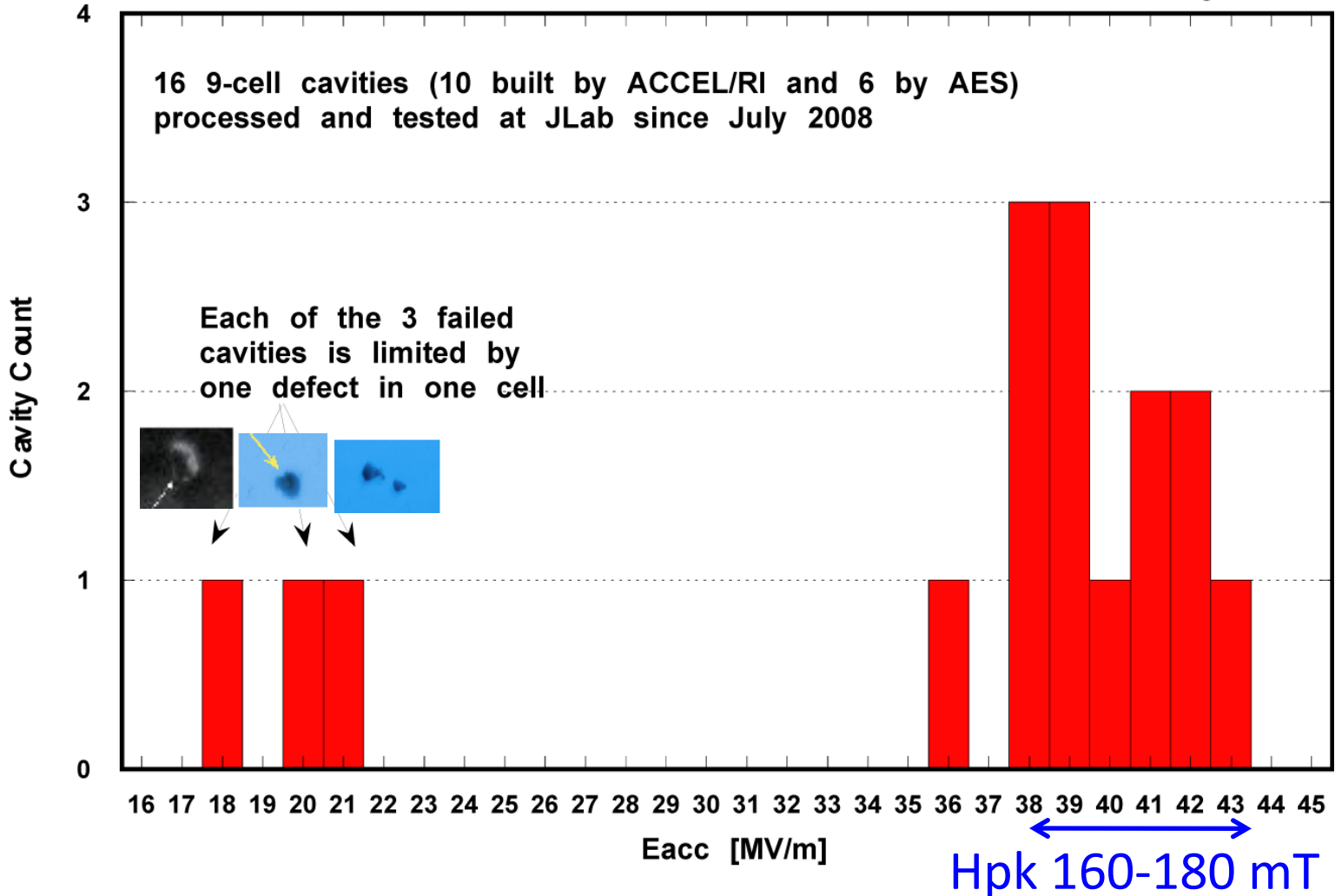
An example of 90% yield at 35 MV/m w/ $Q_0 \geq 8E9$ ACCEL/RI cavities without bias

**Gradient Yield of 10 ILC Cavities Built by One Vendor
Processed and Tested at JLab since July 2008**



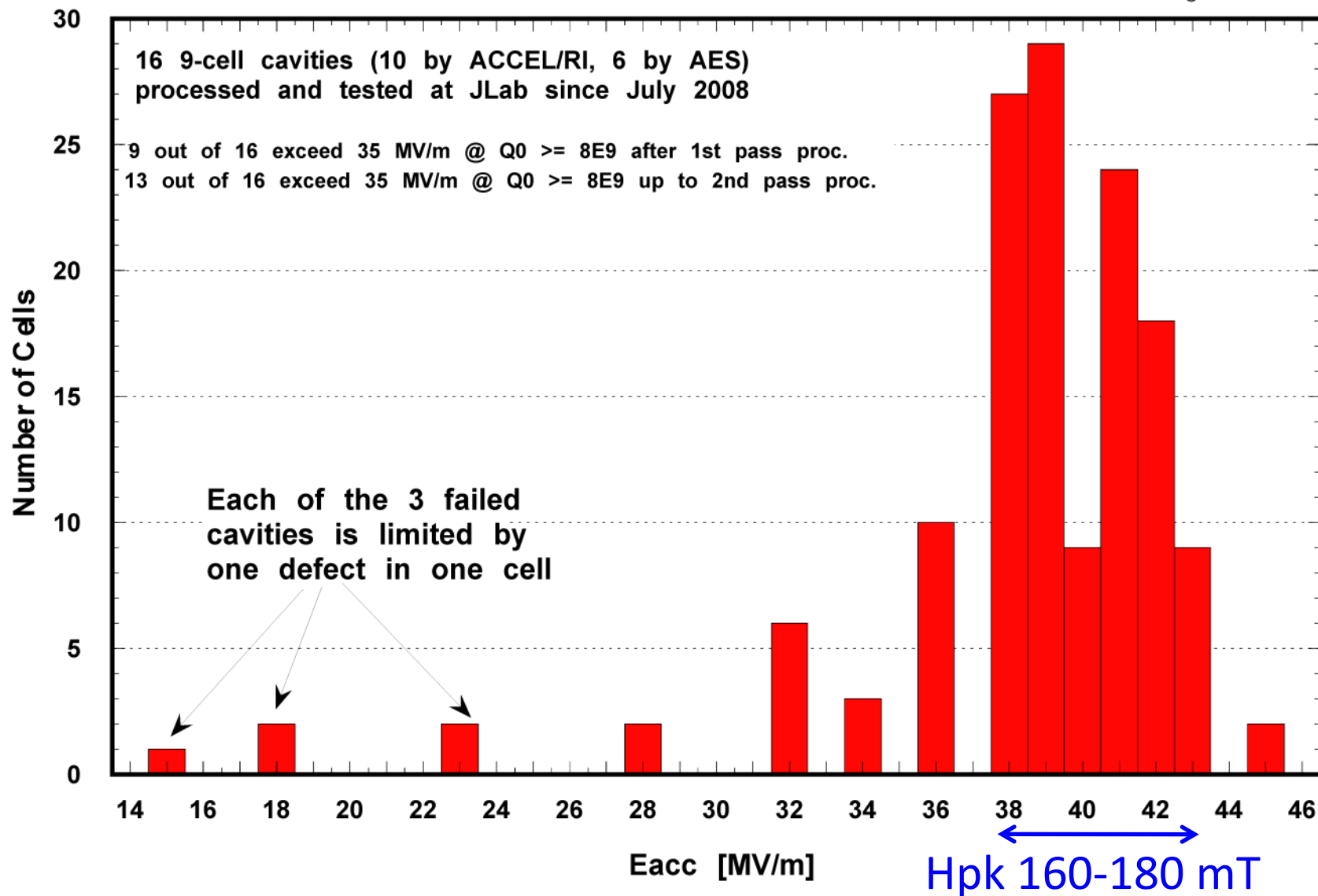
Gradient Scatter (up to 2nd-pass proc.)

RLGeng19oct10



Gradient Reach by Each Cell

RLGeng19oct10



TB9NR001

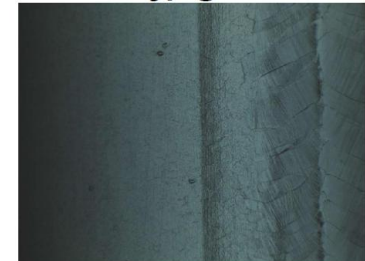
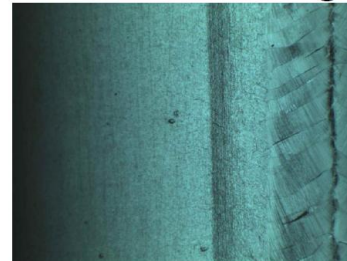
- Initial 10 um BCP not sufficient for removal of identified defect; additional 10 um BCP with cavity orientation flipped.
- Continued reduction in defect density.
- Heavy EP 26oct10 stopped at 80 um removal due to slow removal rate.
- Furnace heat treated at 800C for 2 hr and frequency and FF tuned.
- Final EP of 50 um and first HPR 5nov10; final HPR on going; RF test soon.

The number of spots bigger than 100um

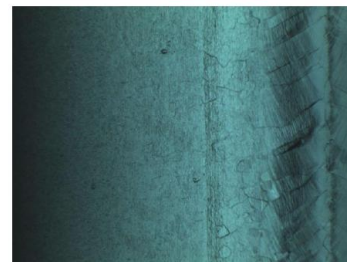
EQUATOR 1		EQUATOR 2	
After 10um BCP			
The half-cell#1	The half-cell#2	The half-cell#3	The half-cell#4
56	97	122	228
After additional 10um BCP			
31	96	66	151

After 10um additional BCP, the number of spots were reduced nearly by half. Most of them is out of machining line.

Equator_NR001_E9_Z1117mm_179Degrees0261.jpg



After 20um BCP, the grain boundary is more obvious.



There are more spots outside the machining line in fine grain cavity.

Other Cavities

- **JLAB LG#1** worked started since coming back from KEK for local grinding and EP. Field flatness tuned, HPR, clean room assm, 120Cx48hr, RF test this week.
- **ICHIRO7** beam tube defects removed by local mechanical polish, field flatness tuned to 96%, light EP scheduled this week.
- **AES6** local re-melt with electron beam under preparation.
- **MHI#8** en route from KEK for cross-region exchange.