New Results on Field Emission Suppression in EP Multi-Cell Cavities at JLab

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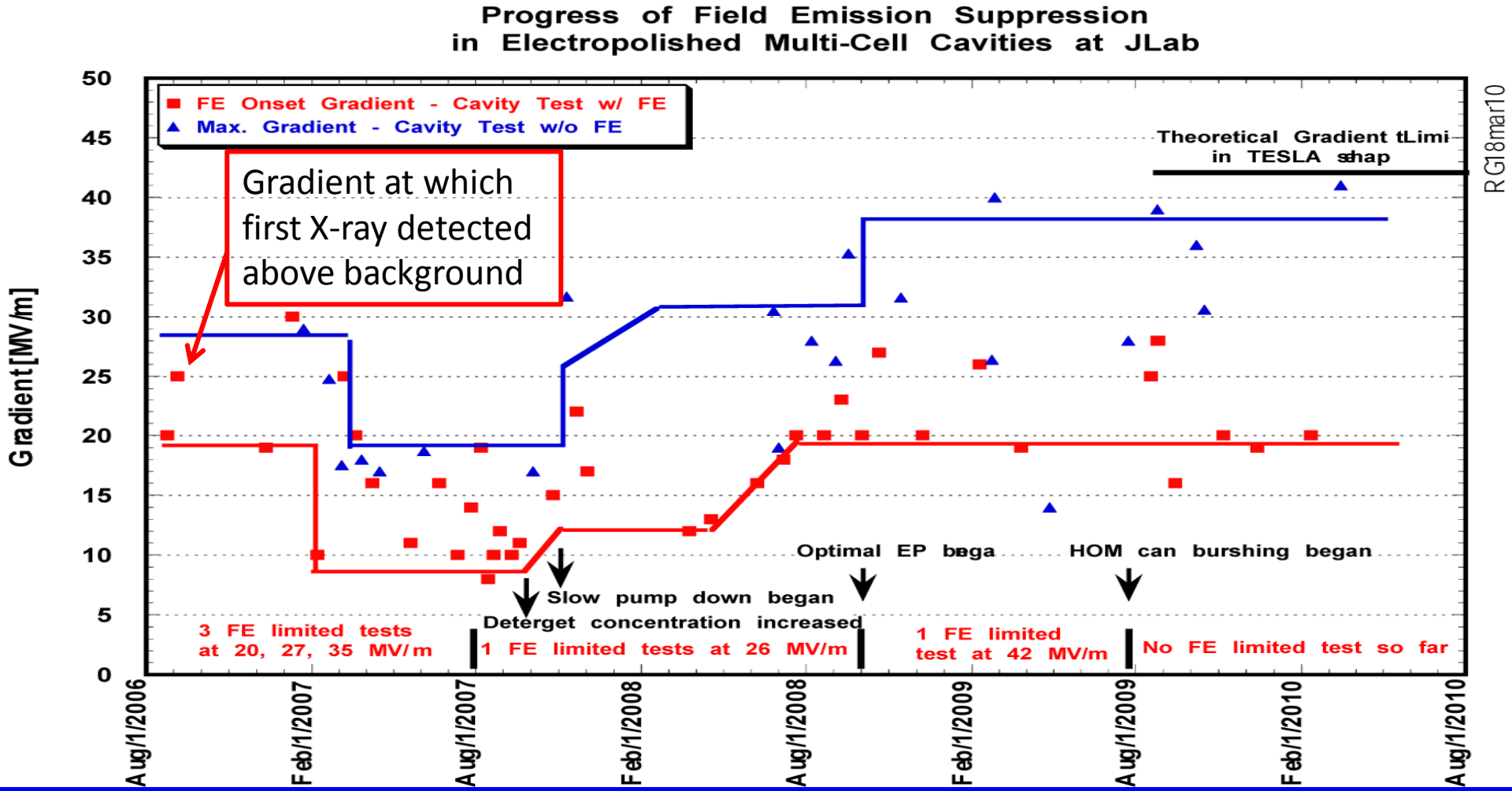
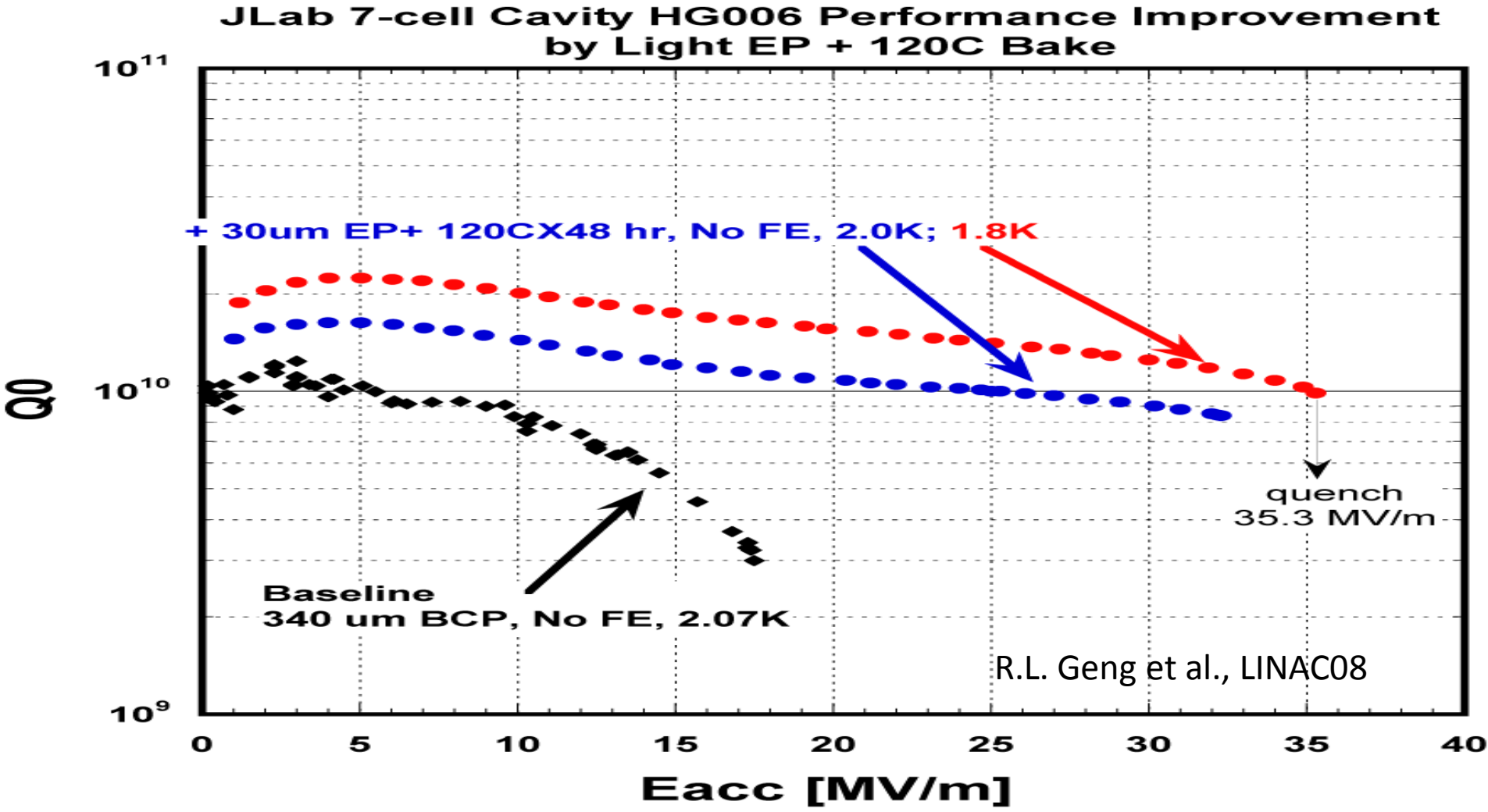
Field Emission On-set Analysis of EP Multi-Cell Cavities at JLab

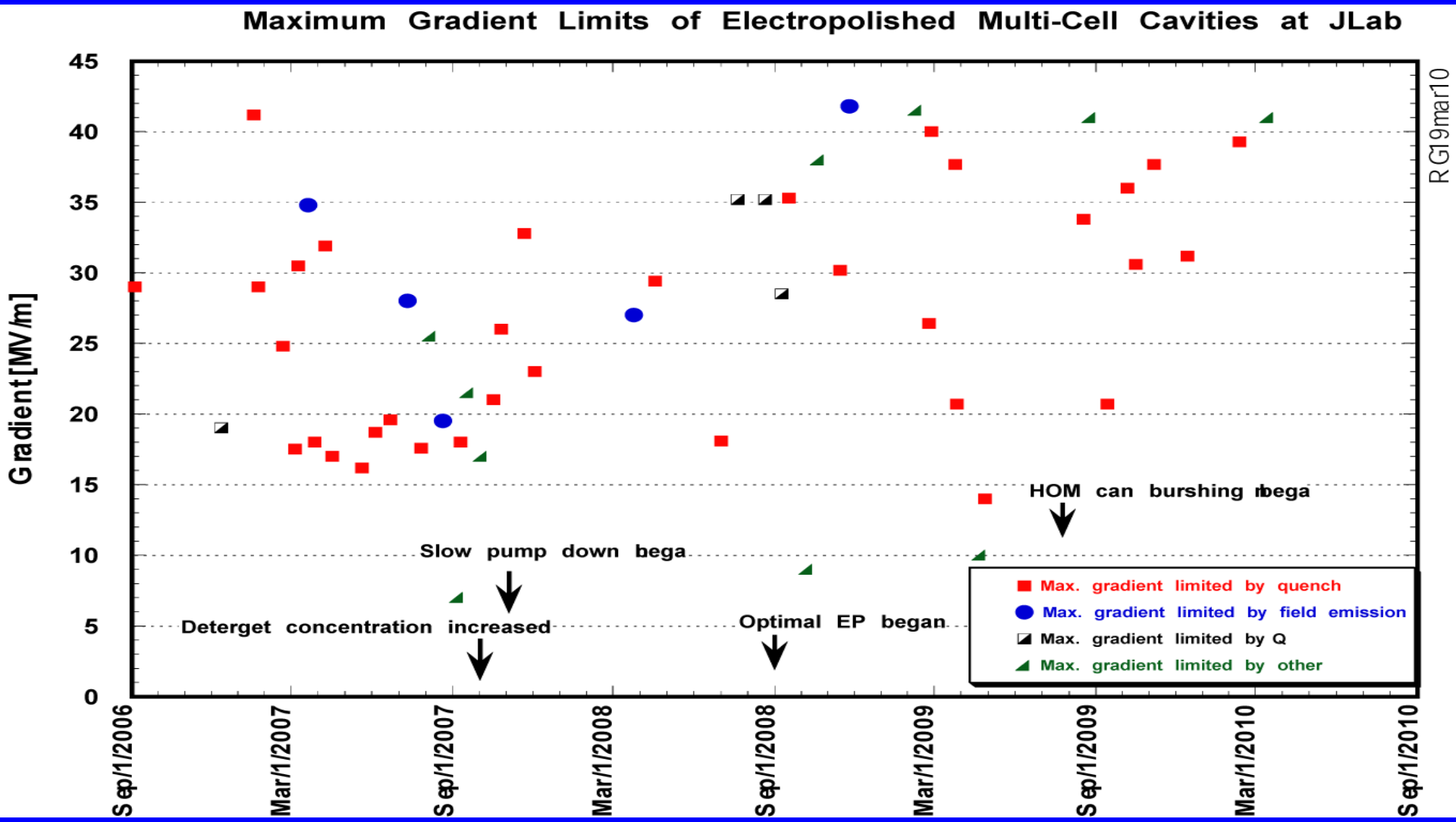


First EP 7-Cell Cavity w/o FE at 35 MV/m

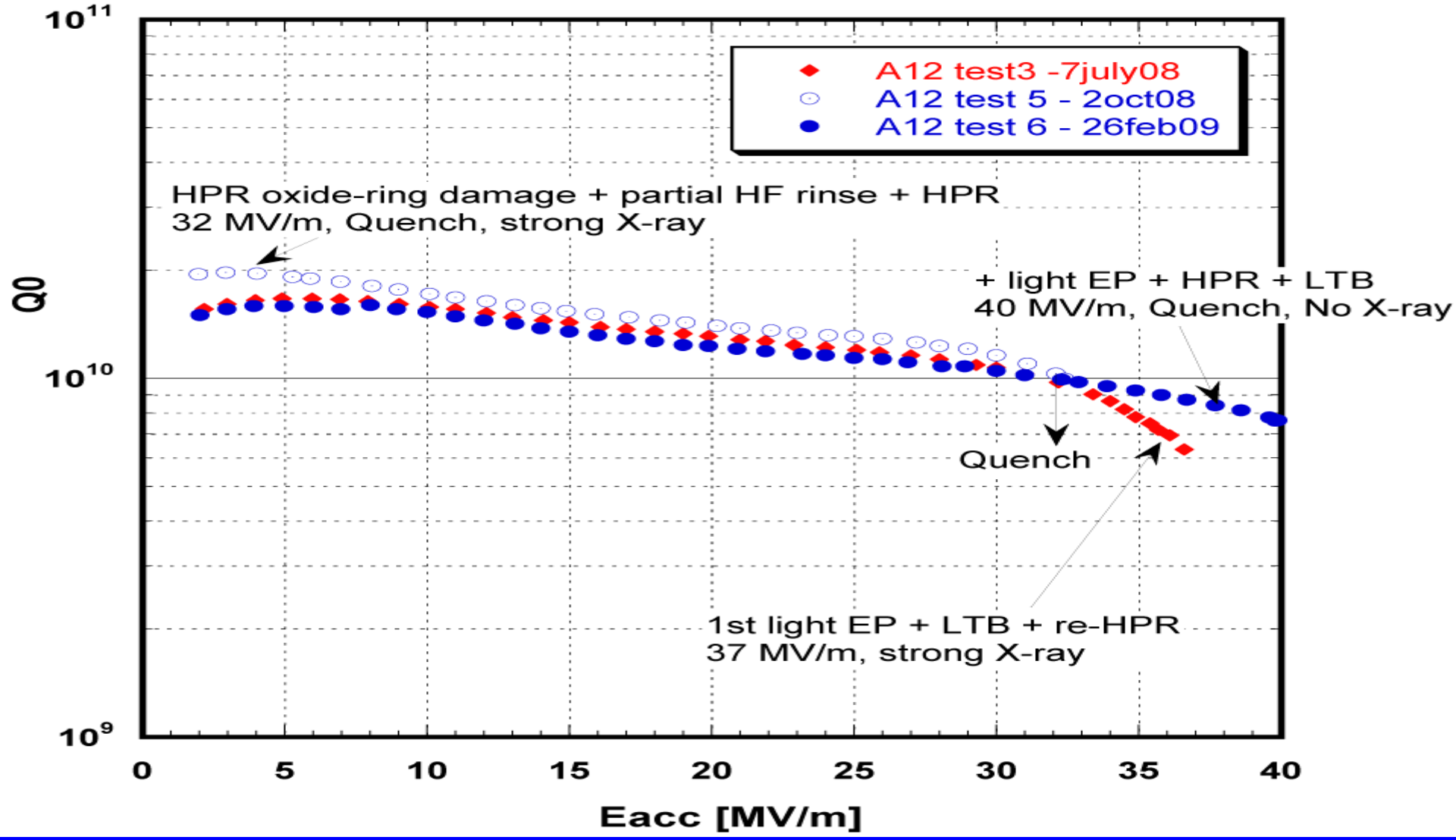
this results directed us to EP 9-cell at lower temperature



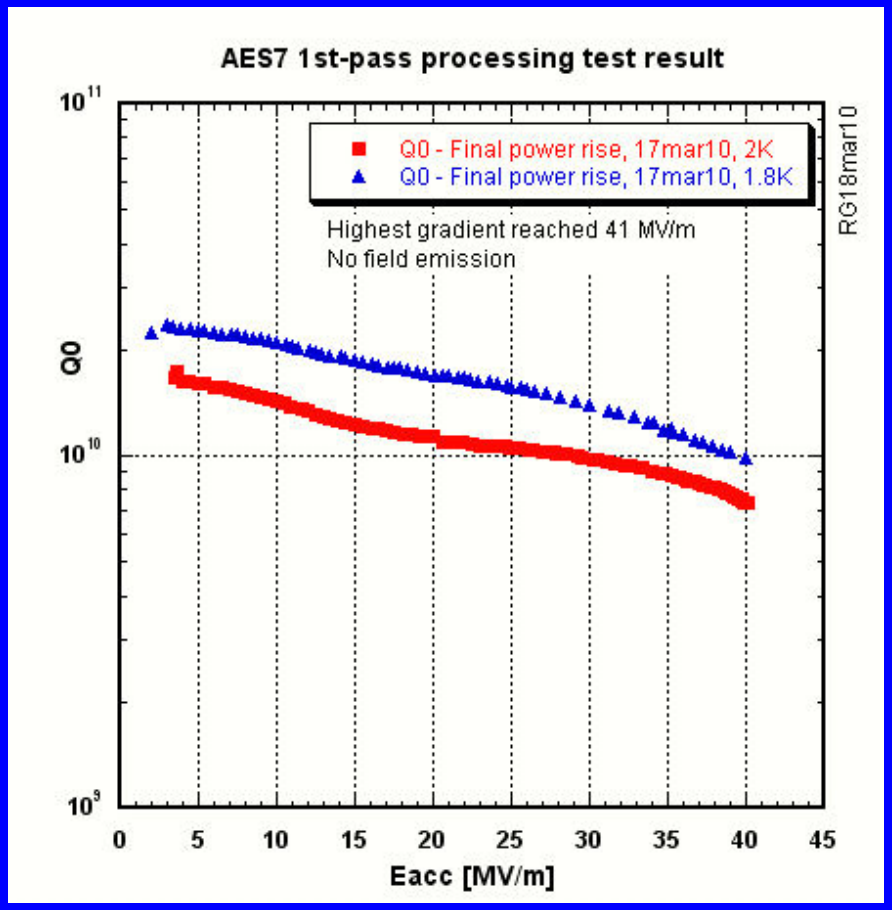
Maximum Gradient in EP Multi-Cell Cavities

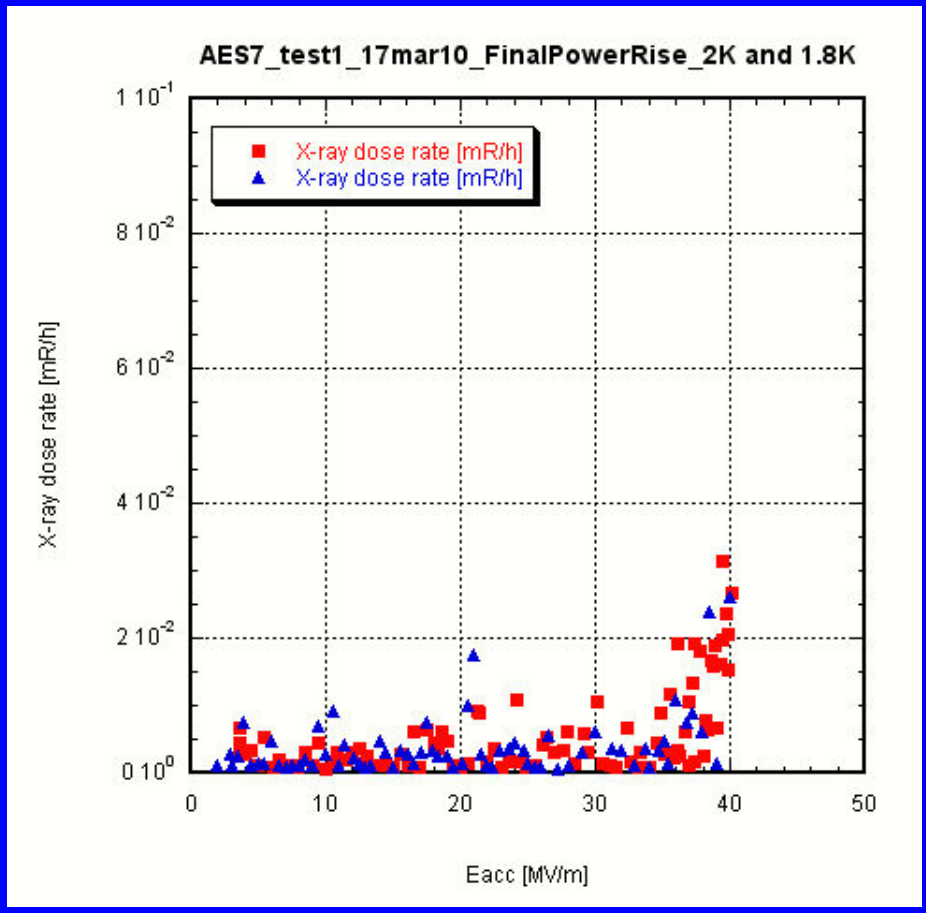


Example of EP 9-Cell Cavity w/o FE



Latest EP 9-Cell Result w/o FE at 40 MV/m





41 MV/m reached during initial power rise, at which gradient precursor FE started
Later power rise limited to 40 MV/m to prevent explosive emitter activation

Summary

- In more than a dozen of 35-40 MV/m EP multi-cell cavity tests, more than 80% demonstrated FE-free performance.
- Improvements in several aspects of cavity processing, handling and assembly are found beneficial.
- Gradient push beyond 40 MV/m are sometimes stopped in view of pre-cursor FE turn on.
- Further studies needed to fully understand the phenomenon.