Update on Global Cavity Database and Yield Evaluation

ILC Cavity Database Group:

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Global Cavity Database Motivation and Goals

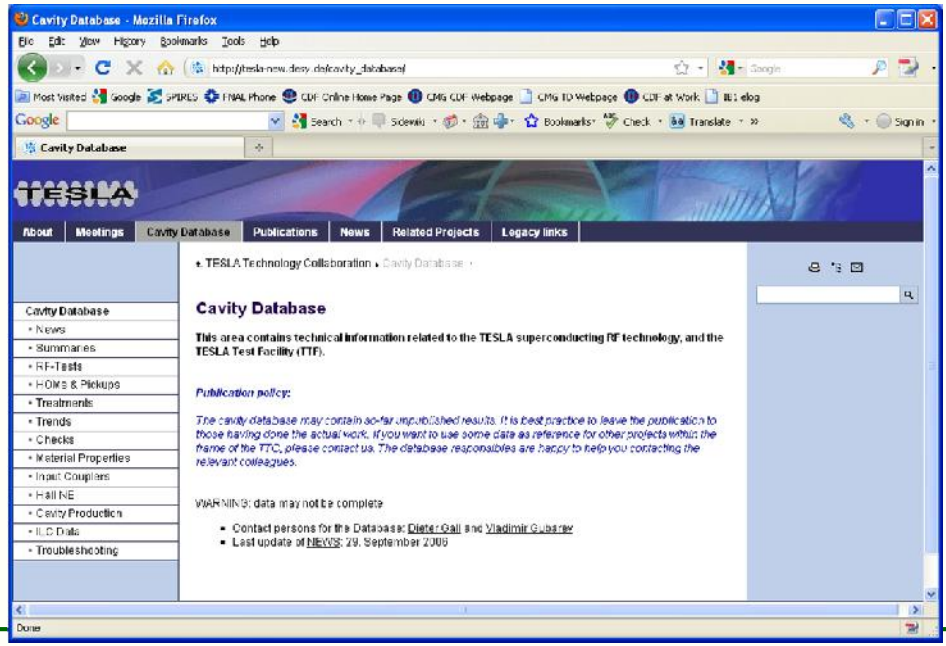
- Common data sample, well defined data cuts
  - Everyone uses the same data to make plots – a common denominator in yield calculations
  - Data cuts can be easily specified, and anyone could reproduce your results
- Data entry rules for reliable and reproducible results
  - All RF tests from the last couple of years are included; may be flagged for exclusion
  - Uniform criteria for data entry: only allowed values for as many as possible items
  - Define everything which might vary or have underlying subtleties, e.g., “LABX#1" might be a final surface treatment referenced as a well-defined recipe anyone can look up
  - No private/sensitive vendor data
  - Anything referred to in a comment field must be for information only, and not data selection purposes
  - Minimize effort required for compliance
  - Provide regular updates at predetermined times

ILC Database tool now fully functional

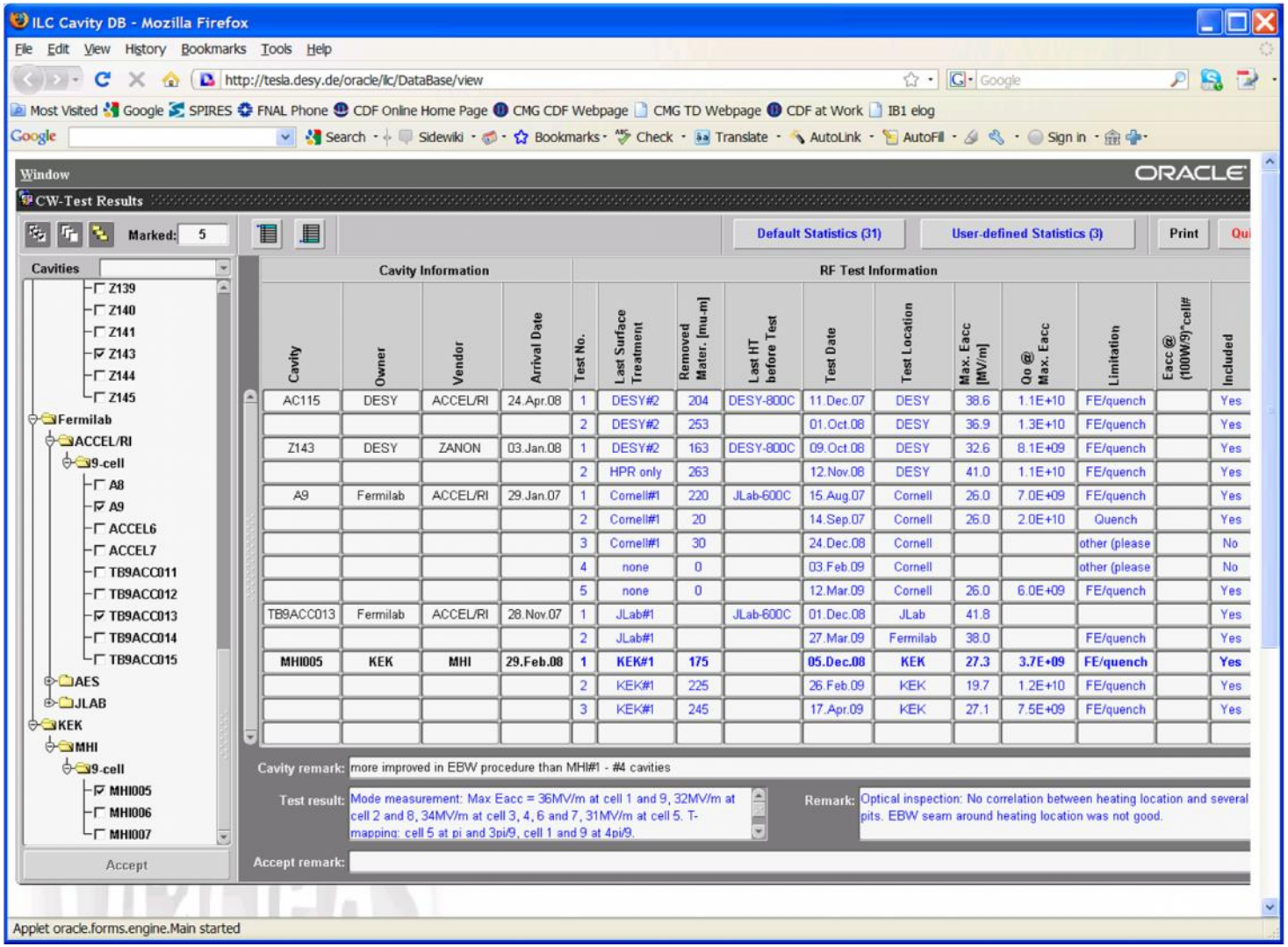
- ILC Database tool was created by the DESY database group
  - DESY kindly agreed to provide limited support for inclusion of global data into their database
- All the participating labs have put their data into the ILC Database
- ILC Database is now fully functional
  - http://tesla-new.desy.de/cavity_database/

Click on “ILC Data”

Two choices: read-only (public) & edit (requires login)



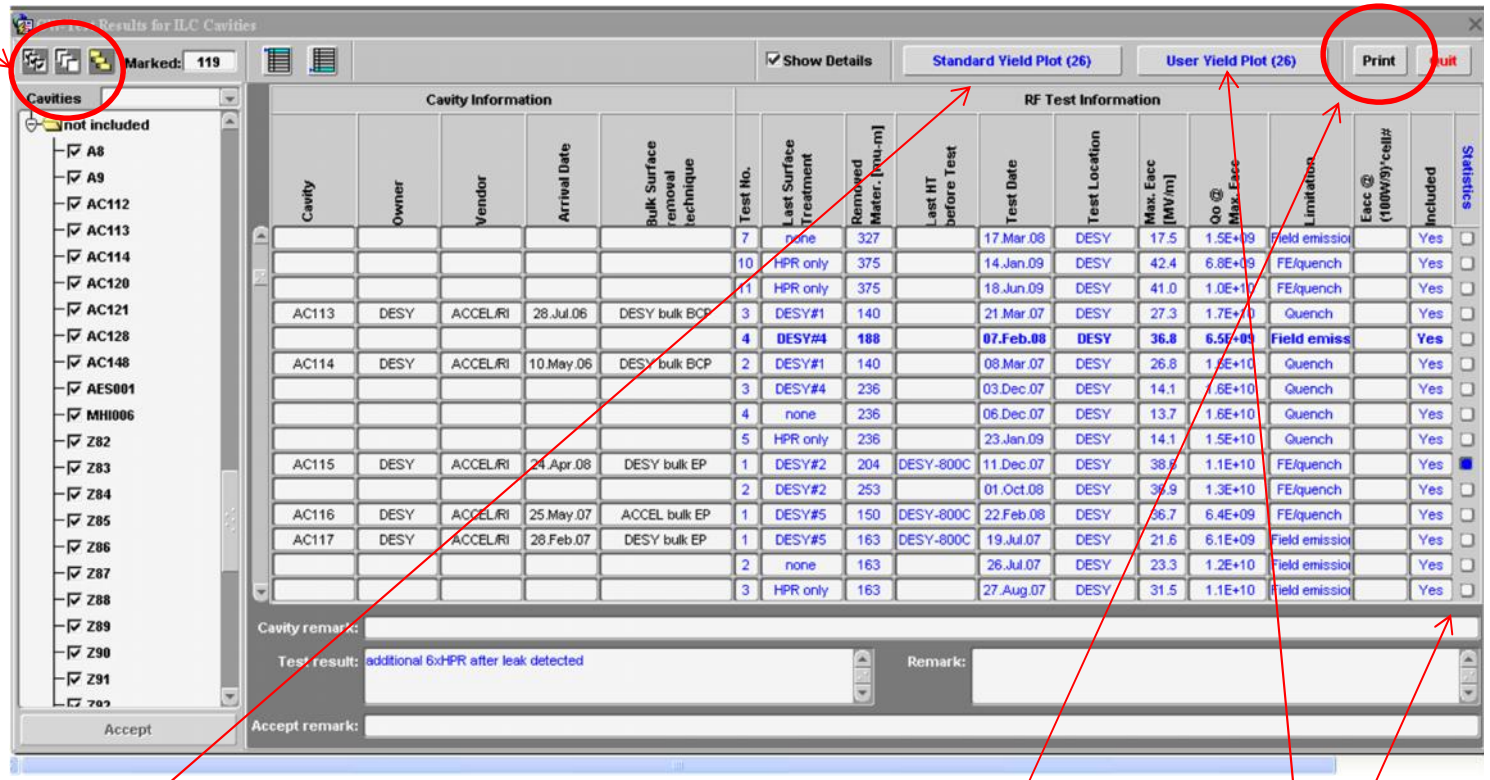
ILC Database Screenshot



For those who have used the DESY database, this will look and feel very familiar

ILC Database: Selected Features (1)

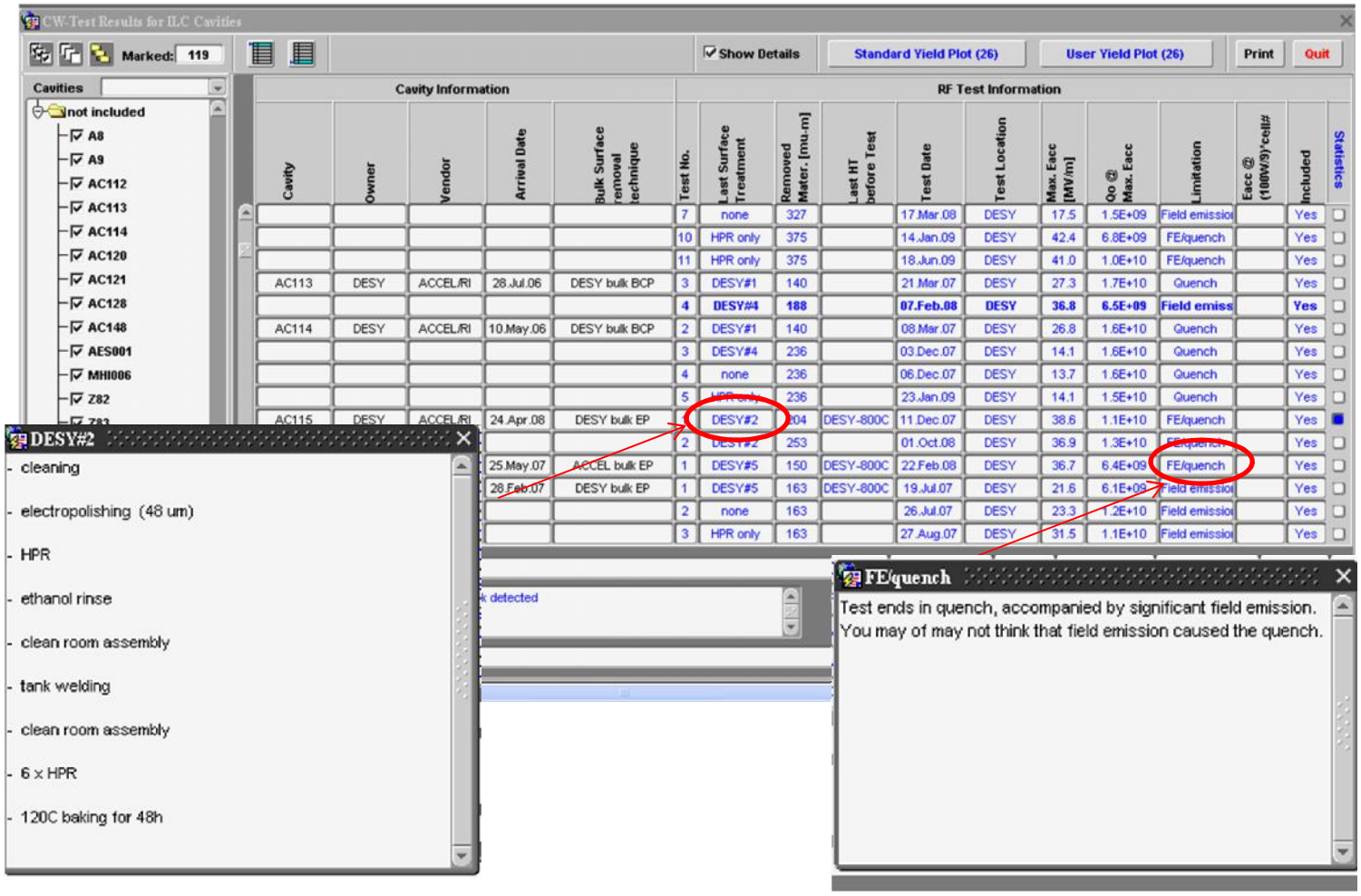
Order and select cavities by features



Extract data in ASCII format and use your private spreadsheet

Make the standard first-pass yield plot defined by ILC DB group,
or make a plot using your own selection

ILC Database: Selected Features (2)



Click on an item to bring up a dialog box explaining definition

ILC Database Status/Plans

- All baseline requirements have been implemented by the DESY DB group

- A few fine-tuning items are still under discussion, to be implemented as time is available, e.g.,
  - How best to incorporate inevitable changes to the logic for standard plots
  - Implement more standard plots, etc.

- All cavity yield plots in the rest of this talk use data extracted from the ILC Database

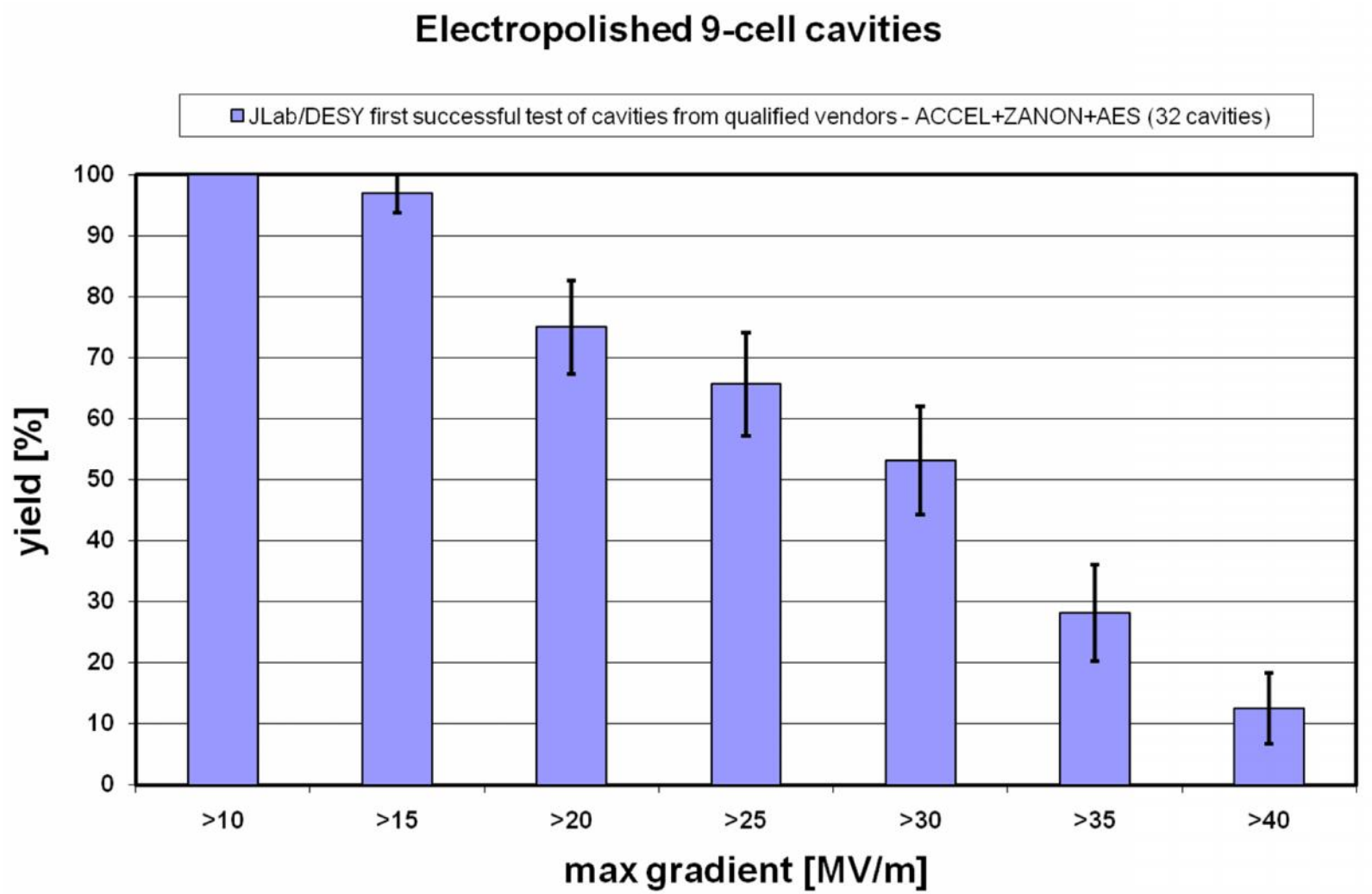
LCWS2010 Cavity Yield Dataset

- ILC Database currently contains data from all three regions, from the last few years [92 cavities]
  - KEK [5 cavities]: [MHI005:MHI009]
  - JLab, Cornell, Fermilab [22 cavities]: [A5: A9], [TB9ACC010:TB9ACC017], [AES001:AES004], [TB9AES005:TB9AES010], JLAB-2
  - DESY [65 cavities]: [Z82:Z110], [AC112:AC129], [Z130:Z135,Z137:Z145], [AC147,AC149,AC150] (Production 4,5,6,7)

"Qualified-Vendor" Production Yield Plot (First Pass) - Definition

- **ILC Database 26.Mar.2010**
- **Cuts**
  - **Cavity from qualified vendor= ACCEL or ZANON or (AES SN>=5)**
  - **Fine-grain cavity**
  - **Use the first successful (= no system problem/limitation) test**
  - **Standard EP processing: no BCP, no experimental processes**
    - **Defined as JLab#1, DESY#2 (weld tank before test), DESY #4 (weld tank after test)**
    - **Ethanol rinse and 120C bake required for DESY cavities**
  - **(Ignore test limitation)**
- **Also known as "first-pass"**
- **Include binomial errors**

Qualified-Vendor" Production Yield Plot (First Pass)



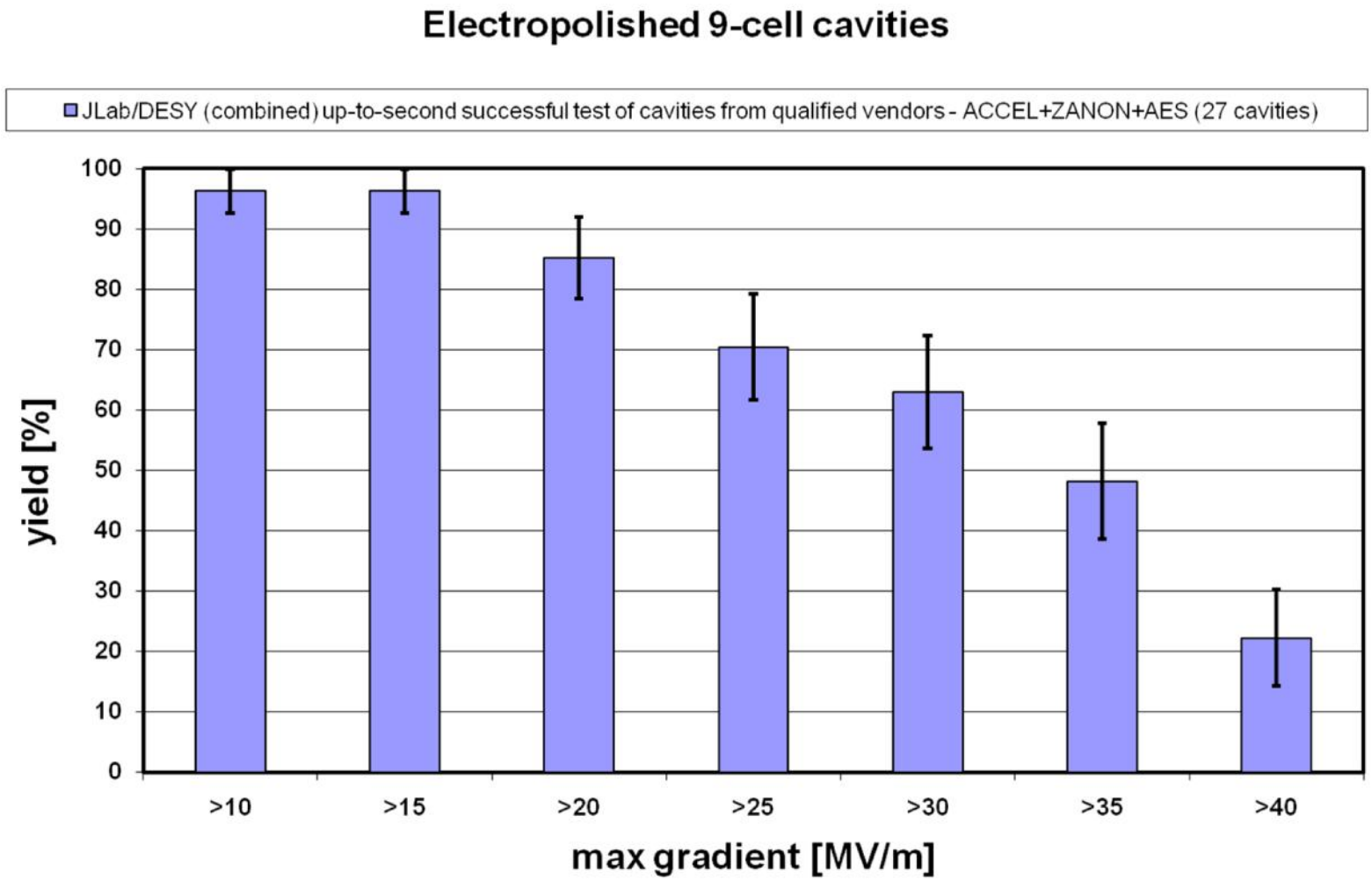
First-pass cavity yield at >25 MV/m is (66 +- 8) %

>35 MV/m is (28 +- 8) %

Up-to-second-pass" Production Yield Plot (qual. vendor) - Definition

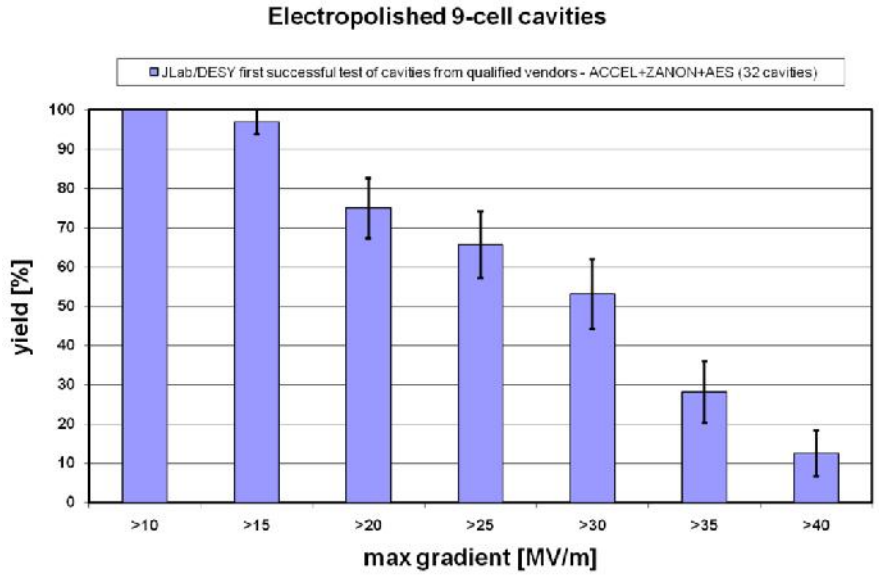
- **ILC Database 26.Mar.2010**
- **Cuts**
  - Cavity from qualified vendor: ACCEL or ZANON or (AES SN>=5)
  - Fine-grain cavity
  - Use the first successful (= no system problem) test
  - Standard EP processing: no BCP, no experimental processes
    - Defined as JLab#1, DESY#2 (weld tank before test), DESY #4 (weld tank after test)
  - (Ignore test limitation)
  - Second pass
    - if (Eacc(1st successful test)<35 MV/m) then
      - if (2nd successful test exists) then
        - » plot 2nd test gradient
      - else
        - » plot nothing [assume 2nd test didn't happen yet]
      - endif
    - else
      - plot 1st successful test gradient
    - endif
- **Include binomial errors**

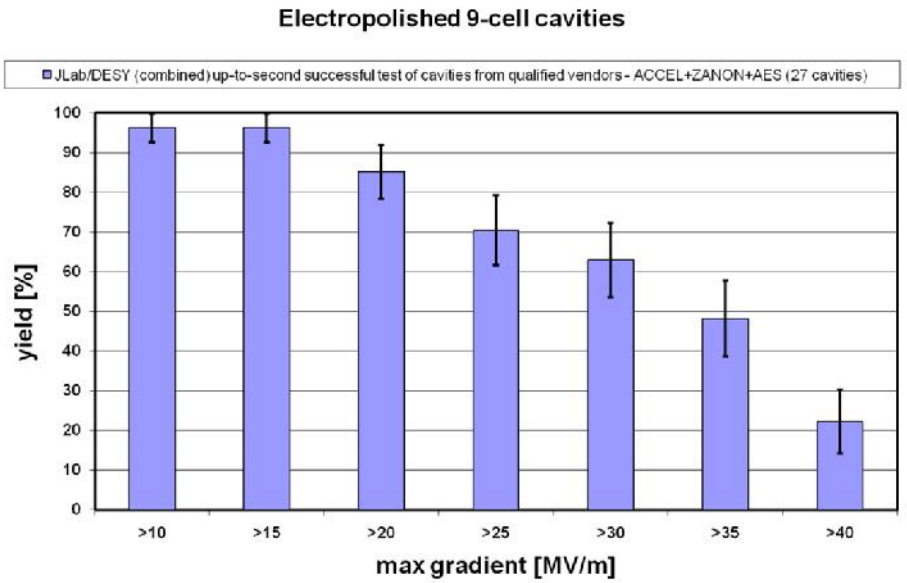
“Qualified vendor” Up-to-Second Pass Yield

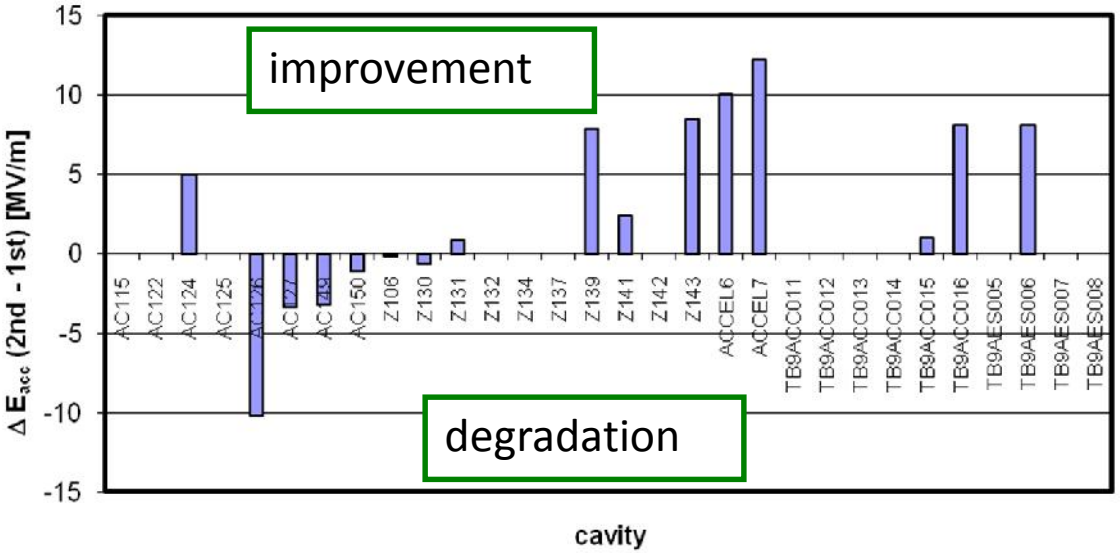


Up-to-second-pass cavity yield at >25 MV/m is (70 +- 9) %
>35 MV/m is (48 +- 10) %

Compare 1st and 2nd pass yields







Yield as a Function of Time (one way of looking at it…)

	yield for [%]			
	>25 MV/m		>35 MV/m	
	1st pass	2nd pass	1st pass	2nd pass
ALCPG-Albuquerque 1.Oct.2009	63+-10	67+-10	23+-9	33+-10
AAP-Oxford 6.Jan.2010	63+-9	64+-10	27+-8	44+-10
LCWS-Beijing 28.Mar.2010	66+-8	70+-9	28+-8	48+-10

NB: errors are very strongly correlated

Within the very limited additional statistics accumulated over the last six months there appears to be improvement in the yield

Summary

- ILC Database now fully functional and available for use
- Updated yield plots were shown
  - First-pass cavity yield at >25 MV/m is (66 +- 8) %
  - >35 MV/m is (28 +- 8) %
  - Up-to-second-pass cavity yield at >25 MV/m is (70 +- 9) %
  - >35 MV/m is (48 +- 10) %
- We will continue to update the ILC database as we have more cavity tests, and systematically update the cavity yield data