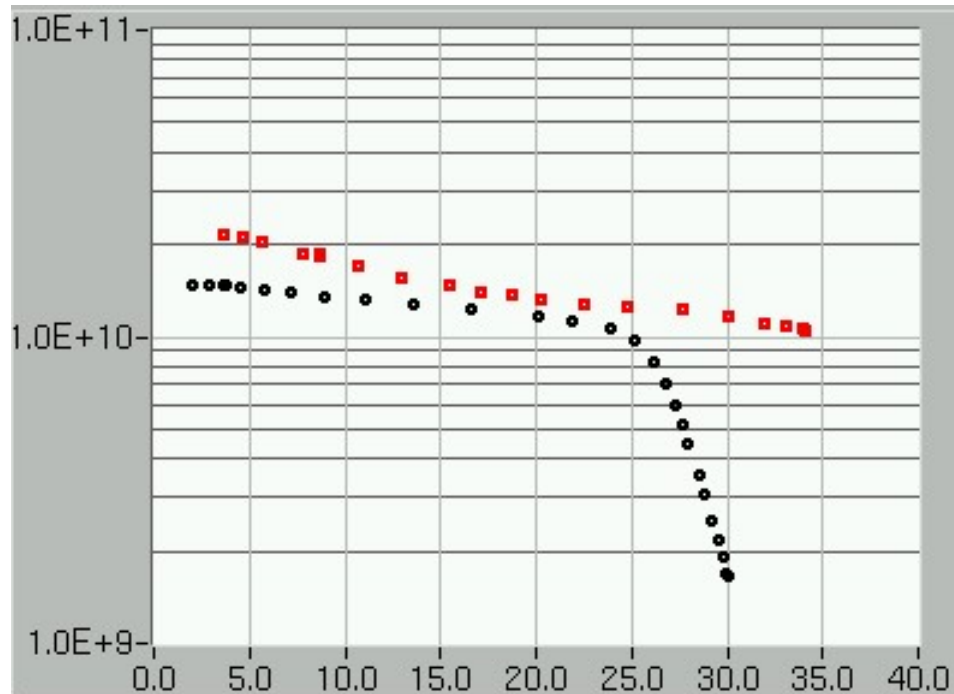


1DE1: First DESY-Cavity successful

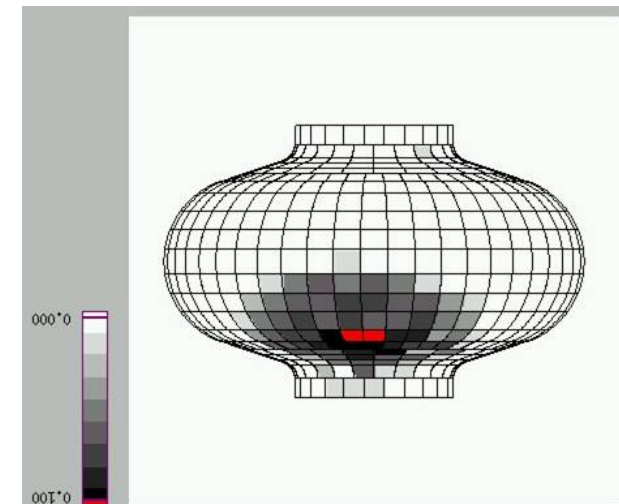
- 1DE1: First Cavity of DESY inhouse fabrication (deepdrawing at Zanon)
- 150 μm EP@Henkel, 800C, 130 μm EP@Henkel, HPR + bake
(add. HPR after bake necessary due to fieldemission)

$E_{\text{acc}} = 34 \text{ MV/m}$ @ $Q_0 = 1 \cdot 10^{10}$; no FE; limited by BD; few MP



Q(E)-curves before and **after**
bake at $T = 2\text{K}$

Detlef Reschke



Quench location far off
the equator

23.01.2007

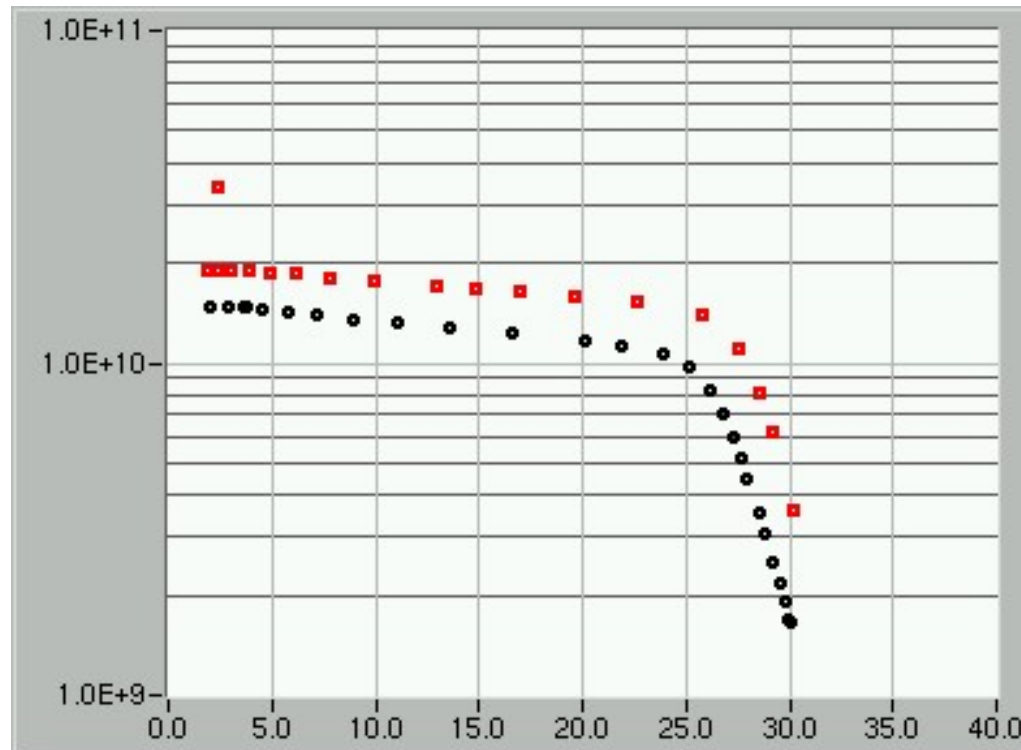
1

1DE1: detailed history

- Cavity made of Heraeus sheets; production 1999
- Deepdrawing of cups at Zanon Co.
- Complete machining and electron beam welding at DESY
- Electropolishing before test 1 at Henkel Co.;
EP + initial HPR before test 4 at Saclay
- HPR, assembly and test at DESY (CTA and hall 3)

1DE1: EP treatment at Saclay, test 4

- add. final EP of 42 μ m, ethanol rinse + HPR at Saclay; add. HPR at DESY:
 $E_{acc} = 30,2 \text{ MV/m} @ Q_0 = 3,6 \cdot 10^9$; no FE; limited by **Quench** (no T-maps)



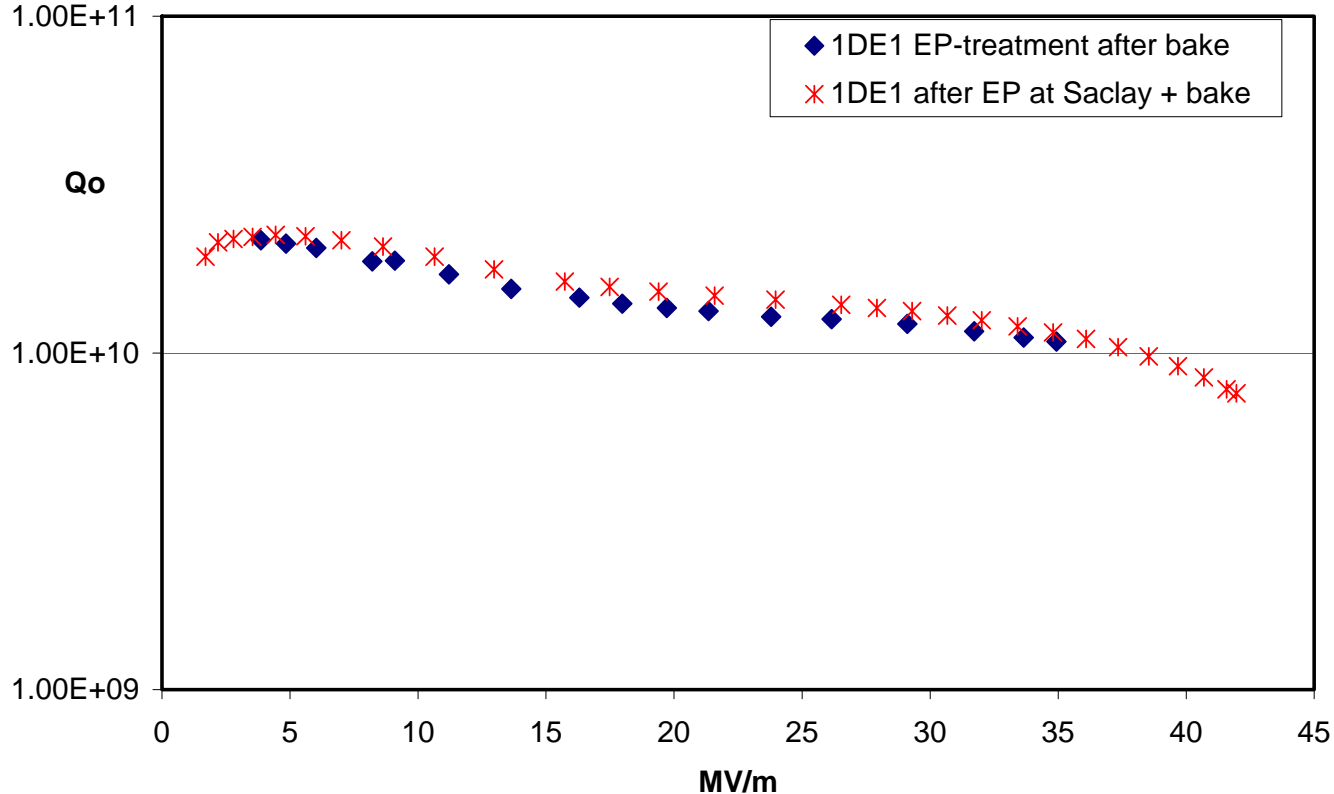
Q(E) at 2 K **before** bake
after first EP (black) +
after EP at Saclay (red)

=> Quench after EP at Saclay at 30MV/m => needs to be confirmed by test
after bake

1DE1: EP treatment at Saclay + bake, test 5

- Test 5: add. 120C / 48h bake at DESY:

$E_{acc} = 42,5 \text{ MV/m} @ Q_0 = 9,7 \cdot 10^9$; nearly no FE (42/-); limited by **BD** (T-maps)



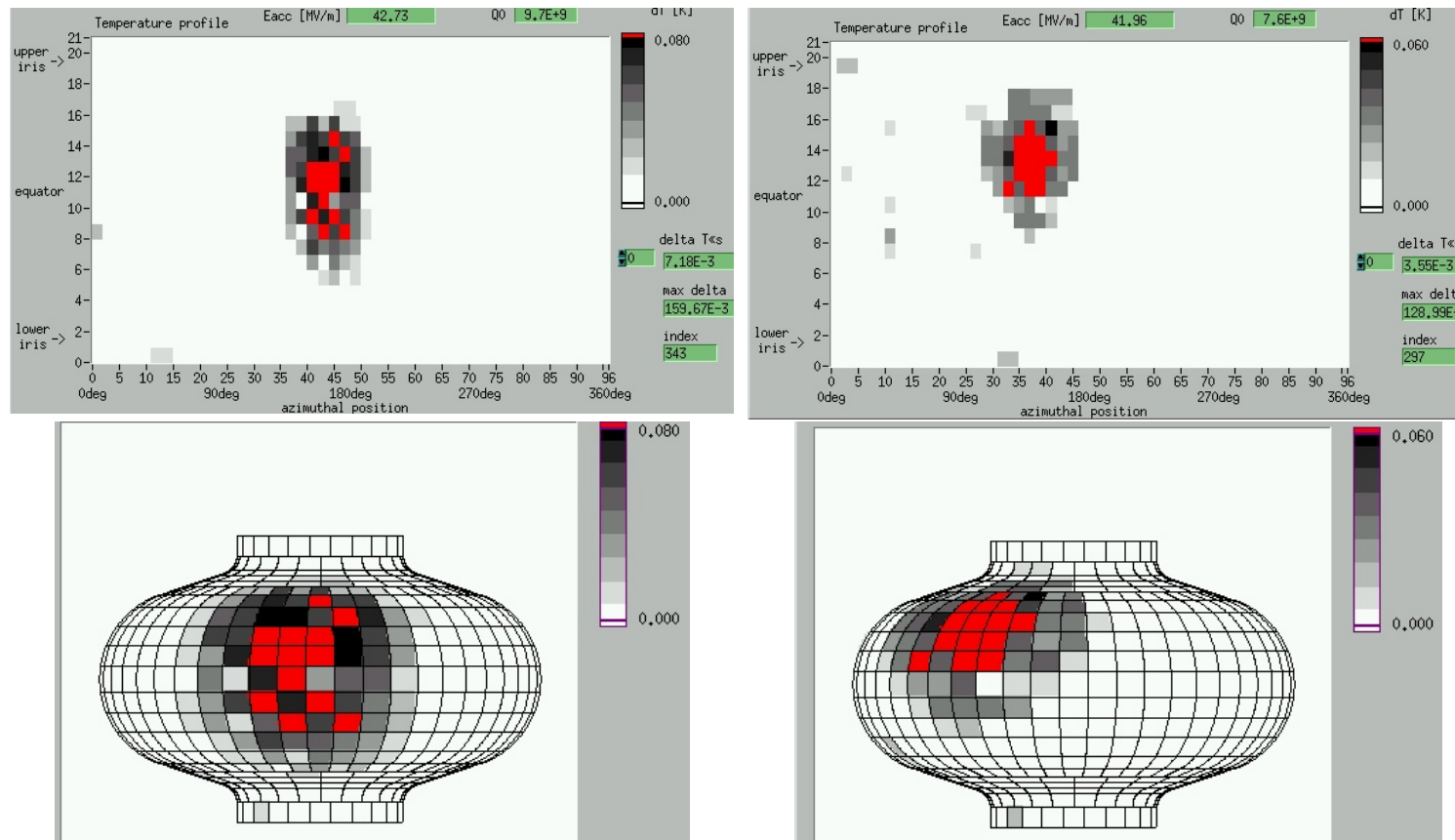
Q(E) at 2 K **after bake**
after first EP (black) +
after EP at Saclay (red)

=> Improvement of 7 MV/m compared to first EP

1DE1: details of test 5

- test 5: add. 120C / 48h bake: T-maps at 1.8K (left) + 2K (right) during quench

Why changes the quench location??? Global thermal BD??





1DE1: details of test 4 (EP at Saclay)

- Main parameters of EP at Saclay:
constant voltage operation; $T < 30^{\circ}\text{C}$, new bath 1 vol HF 40% - 9 vol H_2SO_4 95%, ethanol rinse 26 min
- additional description by F. Eozenou, Oct. 06:
“We polished yesterday 1DE1 cavity during about 1h30. 17 Volts, 1 tr/min, T about 30°C . About 55g of niobium were dissolved. The cavity is very shiny. Shininess has been improved. It has undergone an ethanol rinse and a HPR.”
- Removal rate is $42 \mu\text{m}$ for $1,3 \text{ g}/\mu\text{m}$.
- HPR at hall 3 and test done:
 - => no Q-disease
 - => Quench at $30\text{MV}/\text{m}$; needs to be confirmed by test after bake
 - => improved Q-value at 2K
 - => RRR measured during cooldown with average value 287

1DE1 more rf data

	Test 1 final 80 μ m EP, HPR	Test 2 bake 127C, 48h	Test 3 only HPR (Q(T) incomplete)	Test I/II in Saclay
R_{res} fit	(1,97) n Ω (fit not good)	4,97 n Ω	(1,44) n Ω	-
$\Delta/k_B T_C$ ($T_C = 9,2\text{K}$)	1,9	1,91	(1,58)	-
Q_{BCS} (4,3K)	$3,88 \cdot 10^8$	$5,67 \cdot 10^8$	Not measured	-
$Q_{0,\text{max}}$ (1,8K)	$3,4 \cdot 10^{10}$	$3,88 \cdot 10^{10}$	$3,28 \cdot 10^{10}$	$3,0 / 3,0 \cdot 10^{10}$
Q_0 ($E_{\text{acc}} = 23,5$ MV/m; 1,8K)	$1,7 \cdot 10^{10}$	$1,7 \cdot 10^{10}$	$2,0 \cdot 10^{10}$	$1,2 / 1,6 \cdot 10^{10}$

1DE1 more rf data II

	Test 4 final 42 μm EP at Saclay, HPR	Test 5 After 120C/48h bake at DESY	Test	Test
R_{res} fit	3,83 n Ω	5,7 n Ω	n Ω	-
$\Delta/k_{\text{B}}T_{\text{C}}$ ($T_{\text{C}} = 9,2\text{K}$)	1,95	1,9	(-
Q_{BCS} (4,3K)	Not measured	$6,8 \cdot 10^8$		-
$Q_{0,\text{max}}$ (1,8K)	$3,4 \cdot 10^{10}$	$3,6 \cdot 10^{10}$	$\cdot 10^{10}$	$\cdot 10^{10}$
$Q_0(E_{\text{acc}} = 23,5$ MV/m; 1,8K)	$2,5 \cdot 10^{10}$	$2,5 \cdot 10^{10}$	$\cdot 10^{10}$	$\cdot 10^{10}$