
dapnia



saclay

Tests sur les Systèmes d'Accord à Froid

pour Cavités 9-cellules @ 1.3 GHz



dapnia



saclay

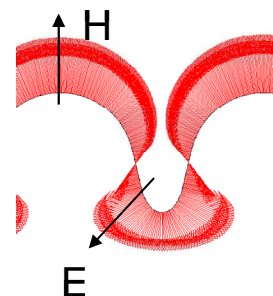
Cooling down and Pumping : few Mhz

cavity shape deformed $\rightarrow \Delta f/\Delta L \sim 315 \text{ kHz/mm}$

Lorentz Forces (E_{acc}) : 1 kHz

cavity length decreases $\rightarrow k_L \sim 1 \text{ Hz}/(\text{MV/m})^2$

$$\Delta f = -k_L E_{acc}^2$$



Microphonics : 20 Hz

mechanical vibrations (stochastic)

WP 8 : TUNERS

Cold Tuning System

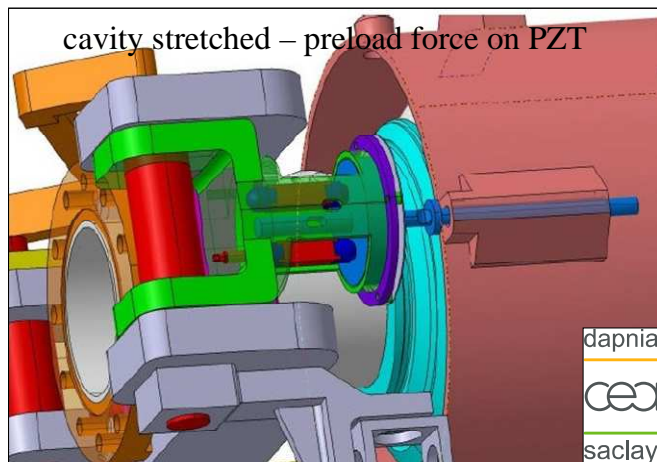
upgrade from TTF & SOLEIL systems

3 cramps on He vessel – eccentric arms

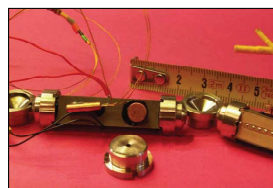
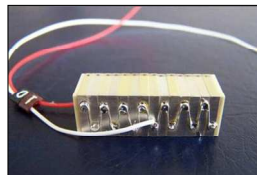
2 PZT supports - stepping motor PHYTRON

Full tuning range : 460 kHz @ 2K

Resolution : 4 nm



Fast Tuners



Piezoelectric Actuator PZT

(lead – zirconate - titanate)

length : 30 mm

NOLIAC



PICMA from PI

150 V → 3 μm @ 2K → Δf : 1 kHz



Magnetostrictive Actuator

(Magnetic Smart Material)

from ENERGEN

Nb₃Sn superconducting coil



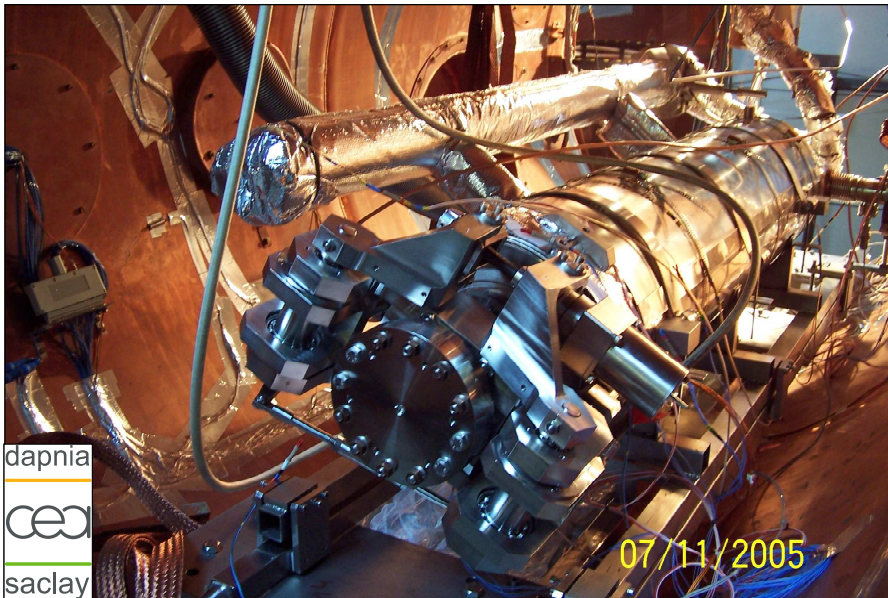
dapnia



saclay

WP 10 :

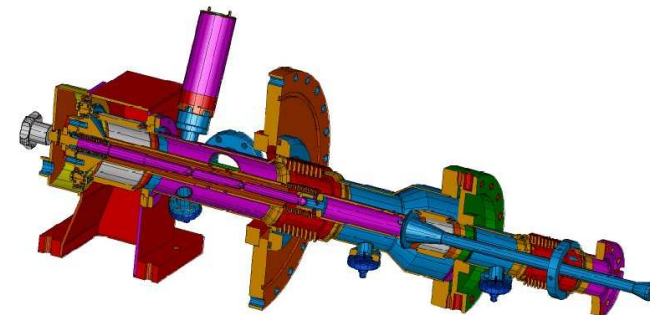
Integrated Tests in Horizontal Cryostat



dapnia



saclay



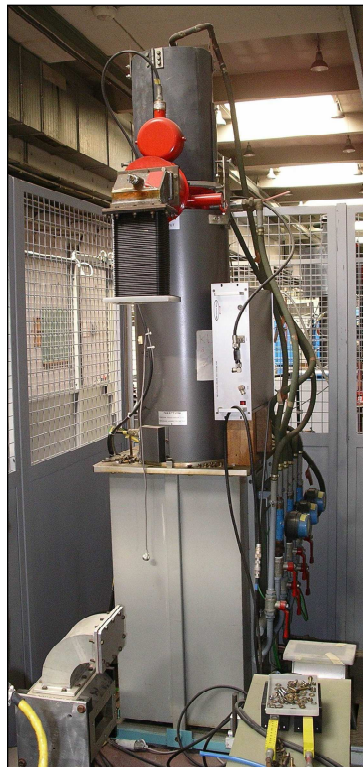
TTF III

high power coupler



9-cell cavity @ 1.3 GHz in CryHoLab

RF Power



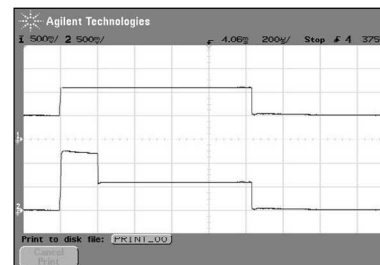
1.3 GHz Thales Klystron $P_{\max} 130 \text{ kW} \rightarrow E_{\text{acc}} 22 \text{ MV/m}$

RF Power

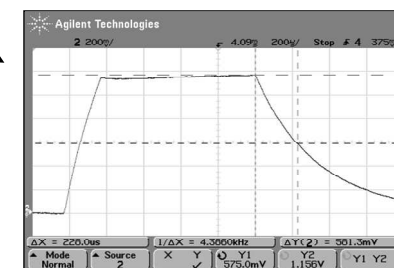
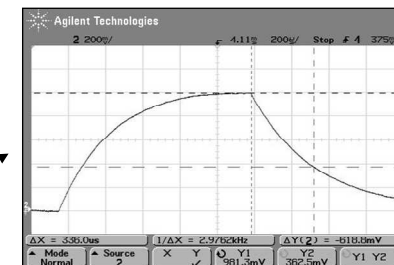
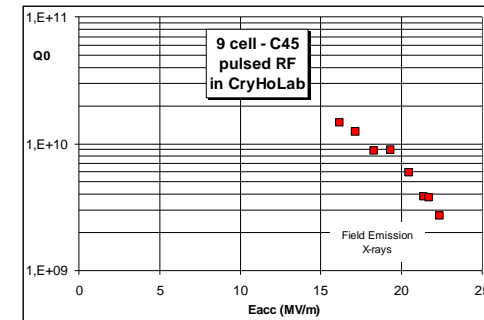
1300 MHz – Klystron

1.5 MW (10 Hz – 1 ms)

Incident Power



pre-pulse on RF power
 \rightarrow fast cavity filling time
 ($4P / 200 \mu\text{s} - P / 800 \mu\text{s}$)



RESULTS

EPAC'06 – Edinburgh – MOPCH 140

(G. Devanz et al.)

