

## SACLAY laboratory report

- R&D in SRF
- R&D in power coupler
- Beam diagnostics
- Analysis of HOM experiment
- Contributions to TDR

# Surface State Analysis

Impurities Analysis :

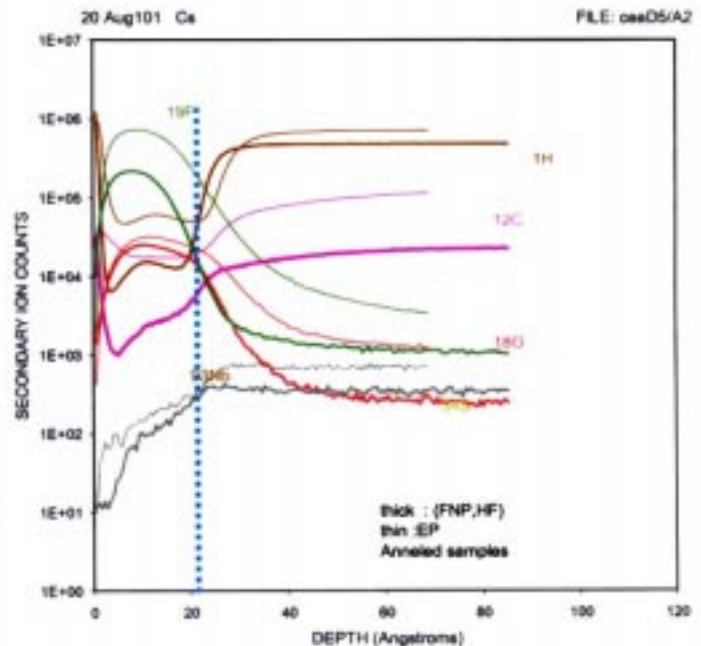
-SIMS

-XPS

....

Surface segregation at metal-oxide interface has been evidenced

Responsible for Q-slope ?



Morphology

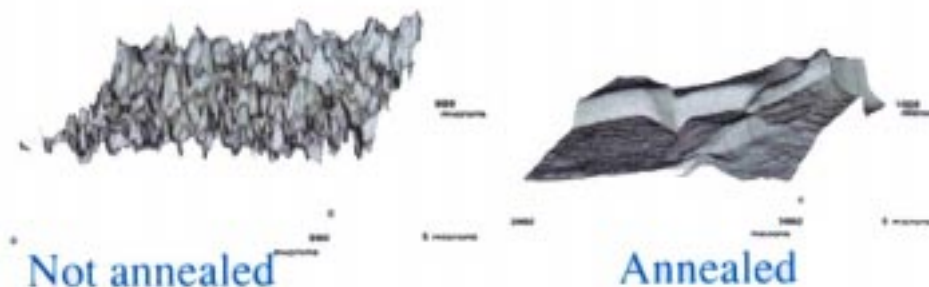
- Profilometry

- STM

- SEM...

Roughness is not the right parameter but ...

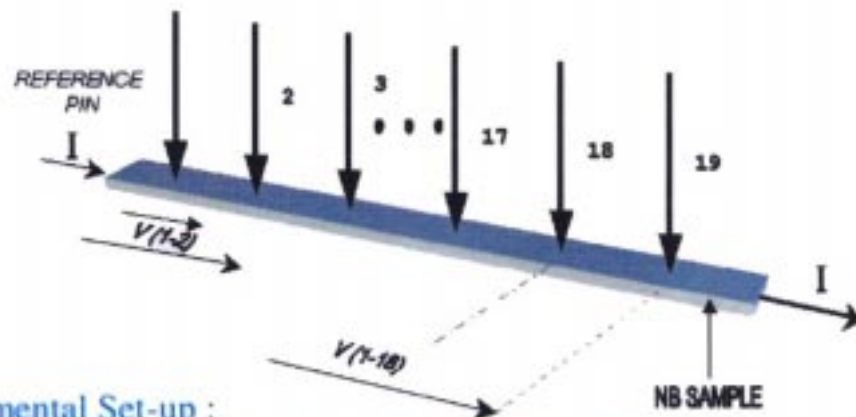
...curvature angle of steps responsible for **quench** ?



Same chemical treatment

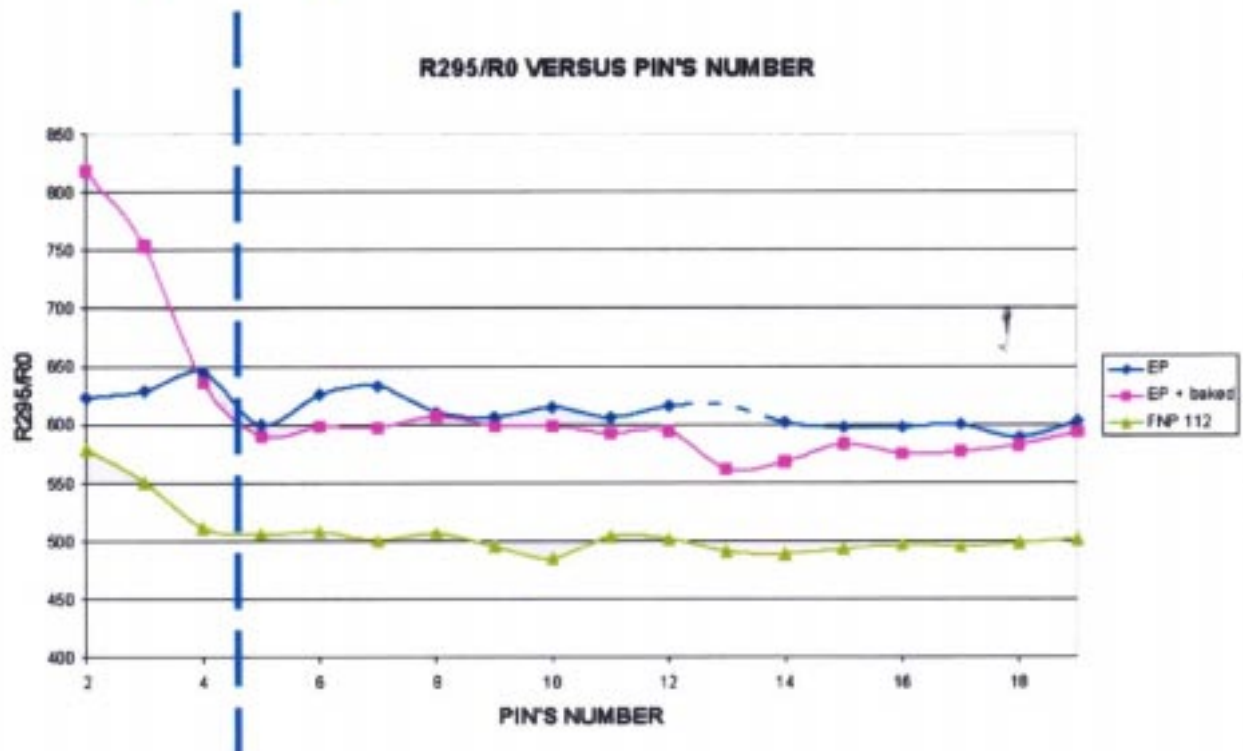
*C. Z. Antoine et al, invited paper,  
10<sup>th</sup> SRF workshop, Tsukuba, Sept. 2001*

# Influence of surf. Treatment on Grain Boundaries Res.



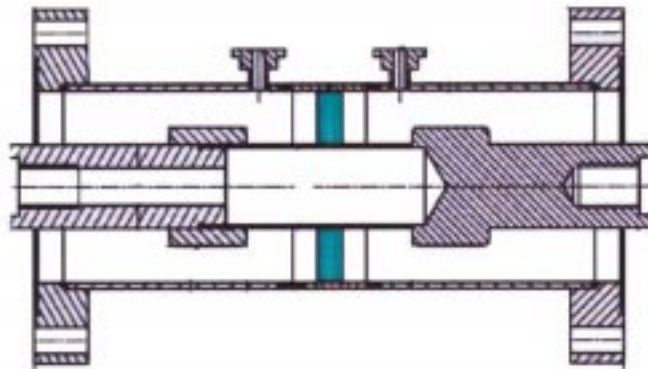
## Experimental Set-up :

- 4-wires method, (+I and - I) in sample => no thermoelectric voltage
- Cumulated voltages :  $V_{1-2}, V_{1-3}, \dots, V_{1-19}$
- Measurements at 300 K and 10K:  $R(T) = (V^+ - V^-)/2I$
- Residual resistance :
  - $R_0 = R(T) - (\alpha T^3 \cdot R_{295K})$



# Power coupler R&D

New Travelling Wave window  
will be tested soon



## Characterization of metal-ceramics brazing

- A very low loss cavity has been built to measure RF losses in ceramics and metal-ceramics brazing samples. This system will allow to measure various ceramics and brazing materials

TESLA Collaboration:  
Toroid Monitors, Meeting in Saclay,  
July 4<sup>th</sup>, 2001

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TTF 2 Toroid (AC Current Transformer) Meeting

Nr.	Type	Topic?	Who?, Dead- line?
1.	D	<p>Discussion on <u>the continuation of the collaboration concerning the toroid system for TTF phase II.</u></p> <p><u>The toroid system has two tasks:</u></p> <ol style="list-style-type: none"> <li><u>to measure the beam current</u></li> <li><u>to provide a protection against accidental beam losses</u></li> </ol> <p><u>We propose to divide the tasks between DESY and CEA Saclay as follows:</u></p> <ul style="list-style-type: none"> <li><u>The electronics for the differential protection will be supplied by the CEA group.</u></li> <li>DESY will provide the hardware for new toroids.</li> <li>DESY is in charge of delivering toroid signals adequate for the differential protection system. This includes preamplifiers and filters.</li> <li>DESY takes care of the charge measurement.</li> <li>The output signals of the differential protection system will be used by the BIS and an additional very fast protection system based on loss monitors to inhibit the laser beam. These systems will</li> </ul>	all



## Reentrant cavity BPM for TESLA : test in TTF 2

The reentrant beam position monitor is a promising candidate as a standard monitor in TESLA cryo-modules.

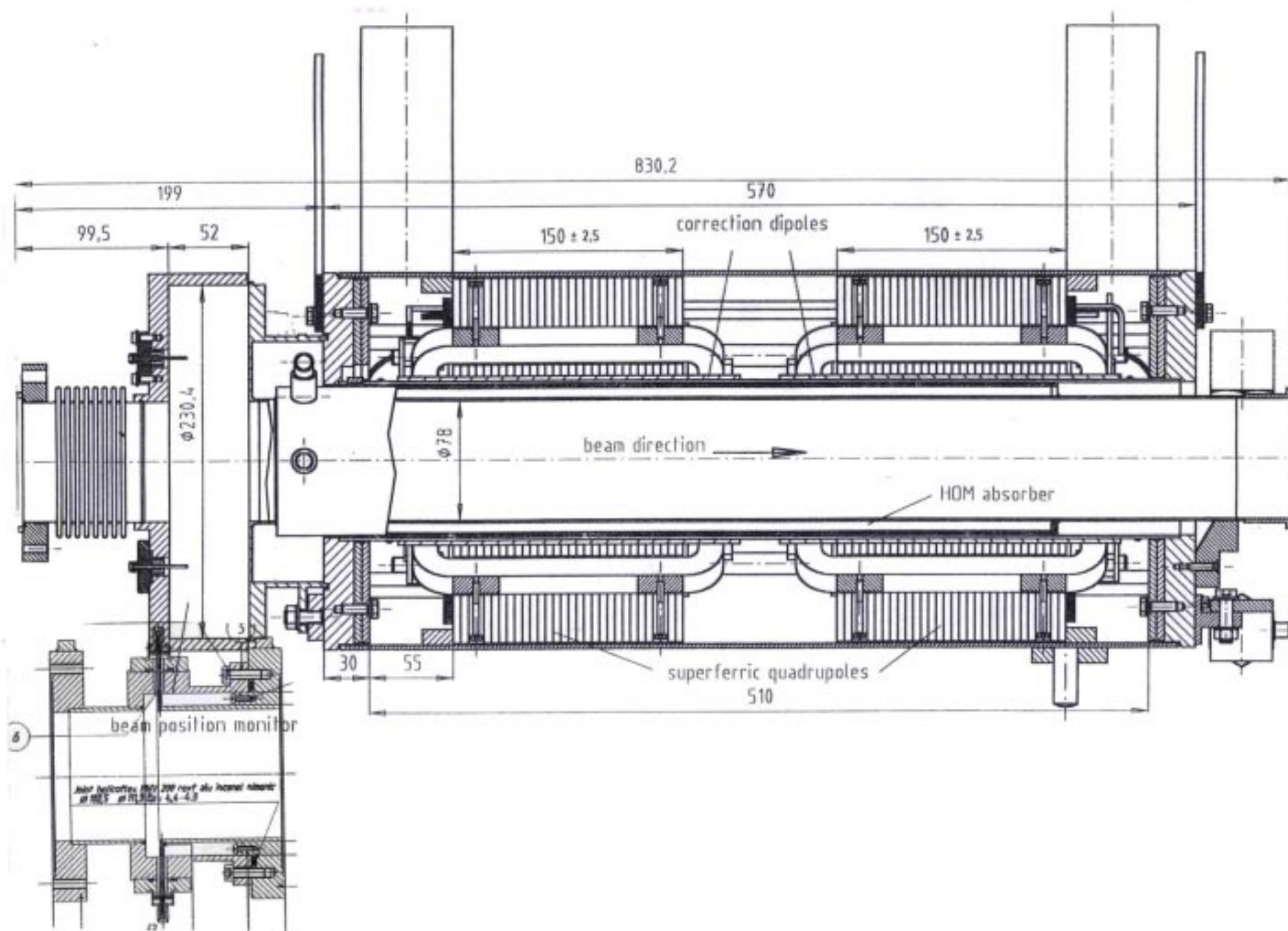
It has the following advantages compared to the currently used type:

- low impedance,
- reduction of the heat load in the cryo-module, as less power is extracted from the beam. In addition this power is extracted by the read-out electronics, not dissipated by ohmic losses in the cryo-system,
- single bunch capability, due to larger bandwidth,
- capability to measure the dark current of the module.

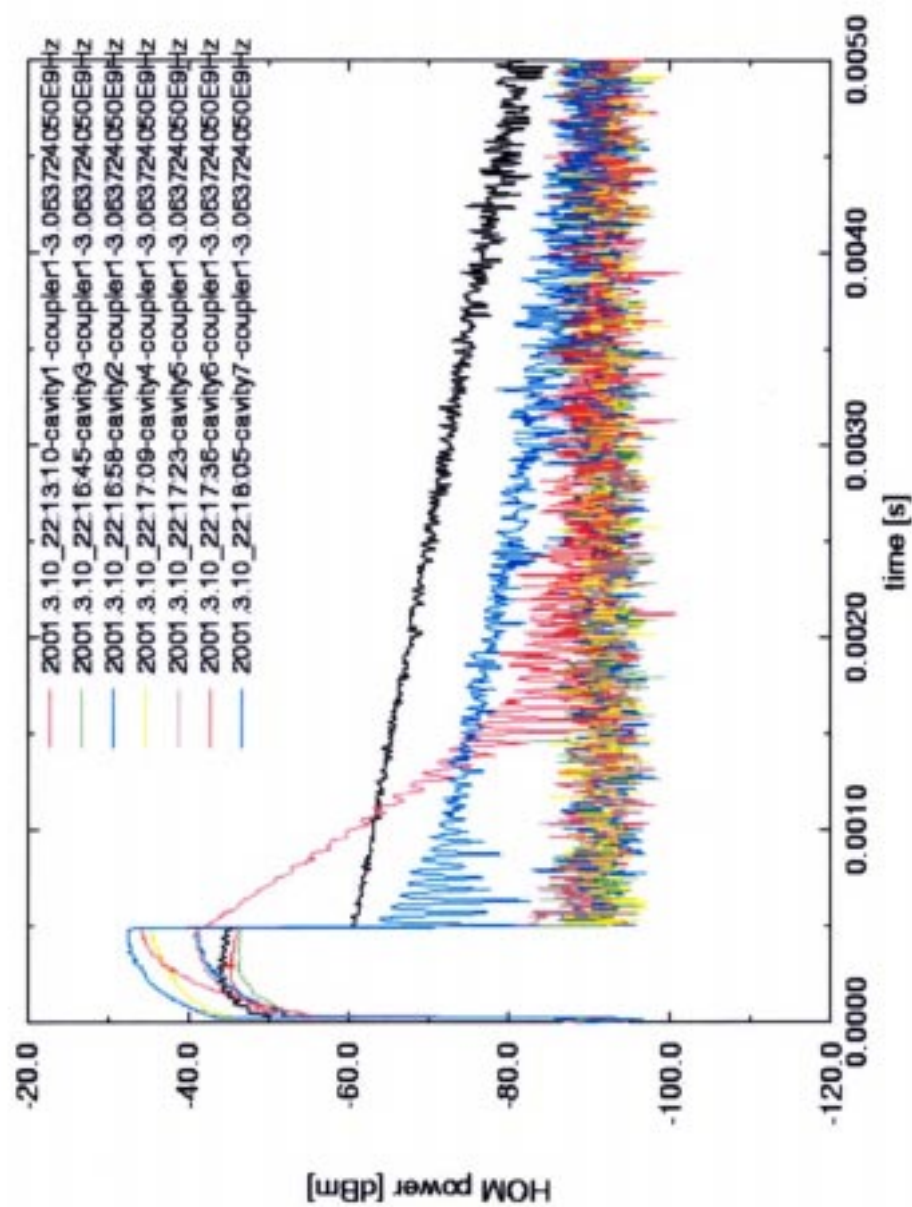
The feasibility to put the reentrant cavity module into the cryo-module has to be checked in detail.

DESY will provide the necessary drawings of the cryo-module within the next week.

We propose to install the BPM in one of the next modules in order to test the device right at the start-up of TTF2.



Modulation Frequency : 23.775 MHz



HOM experiment analysis



## **TDR contributions**

### **Design studies** (in collaboration with DESY, IHEP Protvino, CERN)

#### **Polarized electron injector :**

- Design and capture studies with PARMELA

#### **Beam dynamics**

- Beam-beam instability induced by Linac wake potentials  
 (“banana effect”)

#### **Beam delivery system**

- Optics design of several subsystems
- Design of beam extraction and beam loss calculations

#### **Interaction Region**

- Design of final quadrupoles and masking system
- Backgrounds studies and luminosity monitoring

### **Cost Studies** (in collaboration with DESY, LAL Orsay)

- Costing of the electron and positron injectors
- Costing of the beam delivery systems

## An injector linac for the polarized electron beam in TESLA

TESLA will comprise three 500 MeV injectors linacs. We have studied the one for the polarised electron beam. The model is composed of :

- a 120 keV polarised electron source
- a RT linac up to 76 MeV
- a SC linac (2 TESLA modules) up to 500 MeV
- four 10 MW klystrons

