

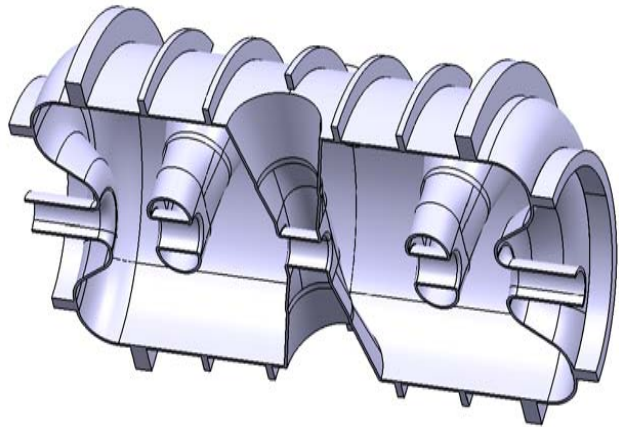


SOPRANO use for Superconducting cavity design

Mrs. Hui Min Gassot

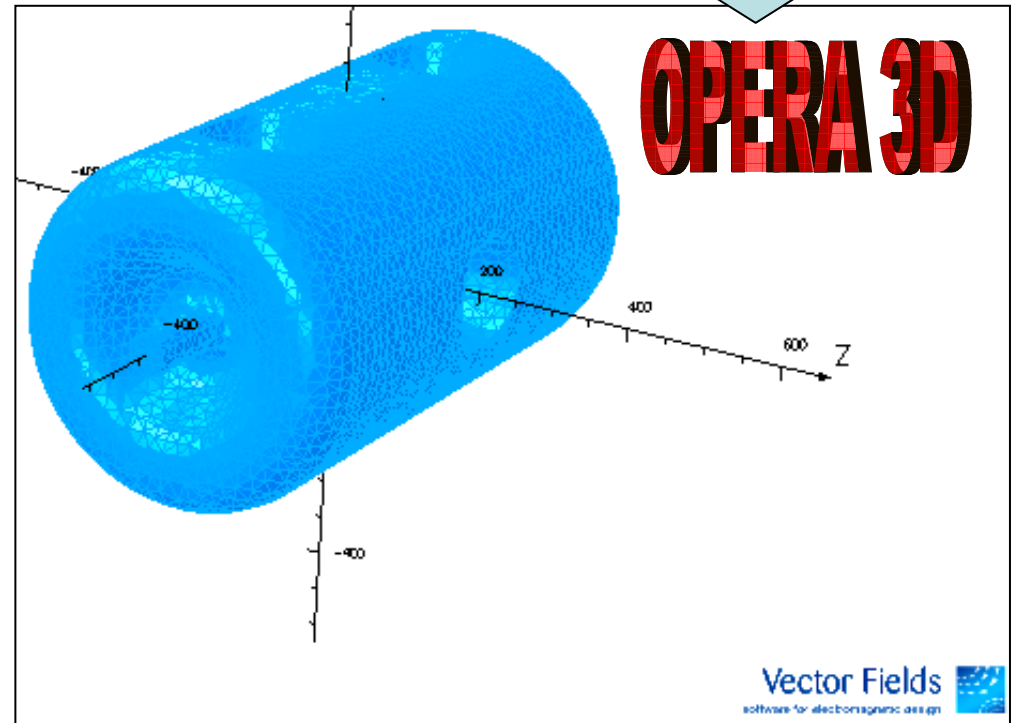
European Cooperation CARE/HIPPI

DESIGN-CATIA



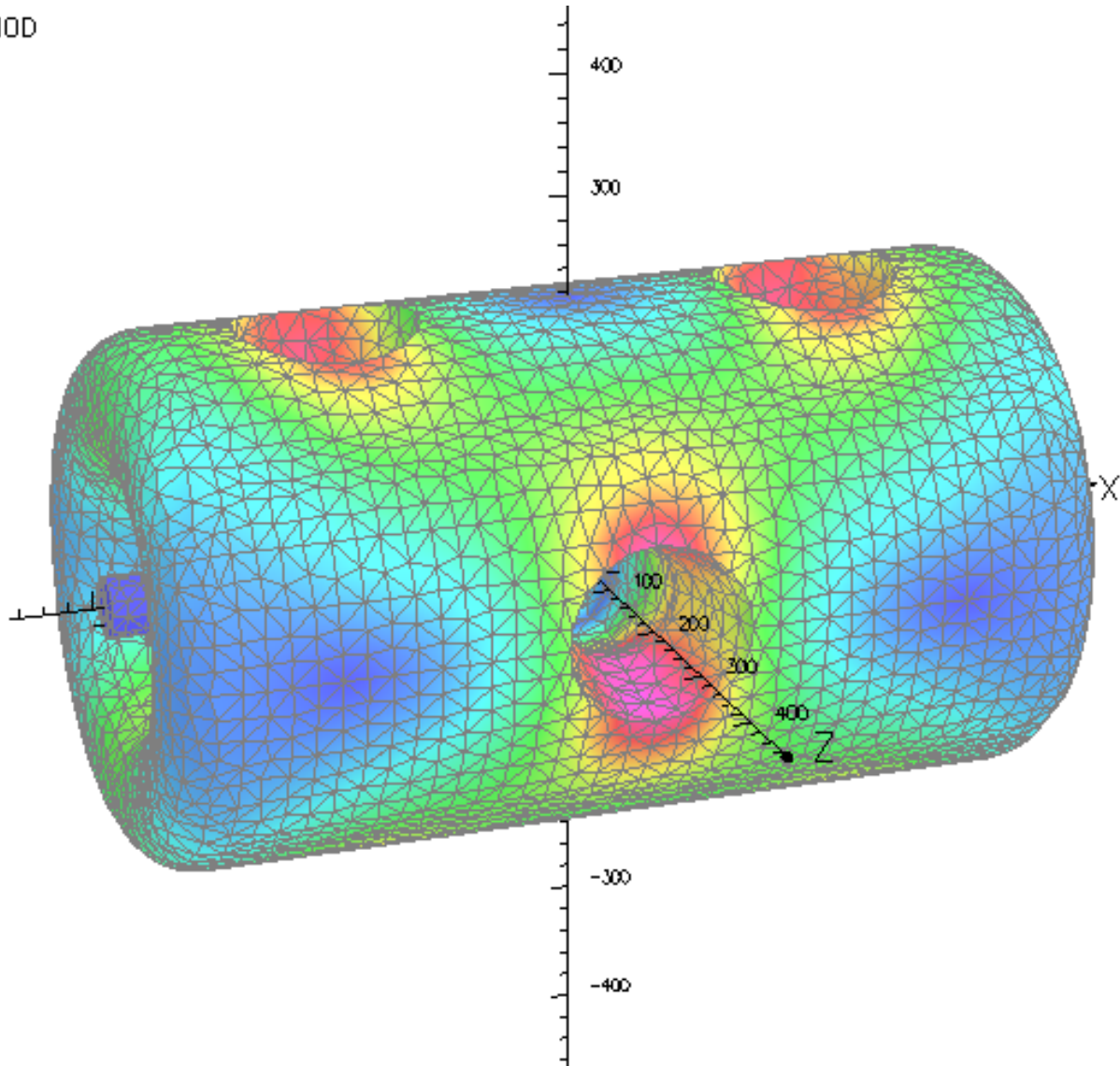
Triple Spoke cavity
total length: 780 mm
Diameter: 424 mm

CaoToSoprano *ipn programs*
H. Gassot

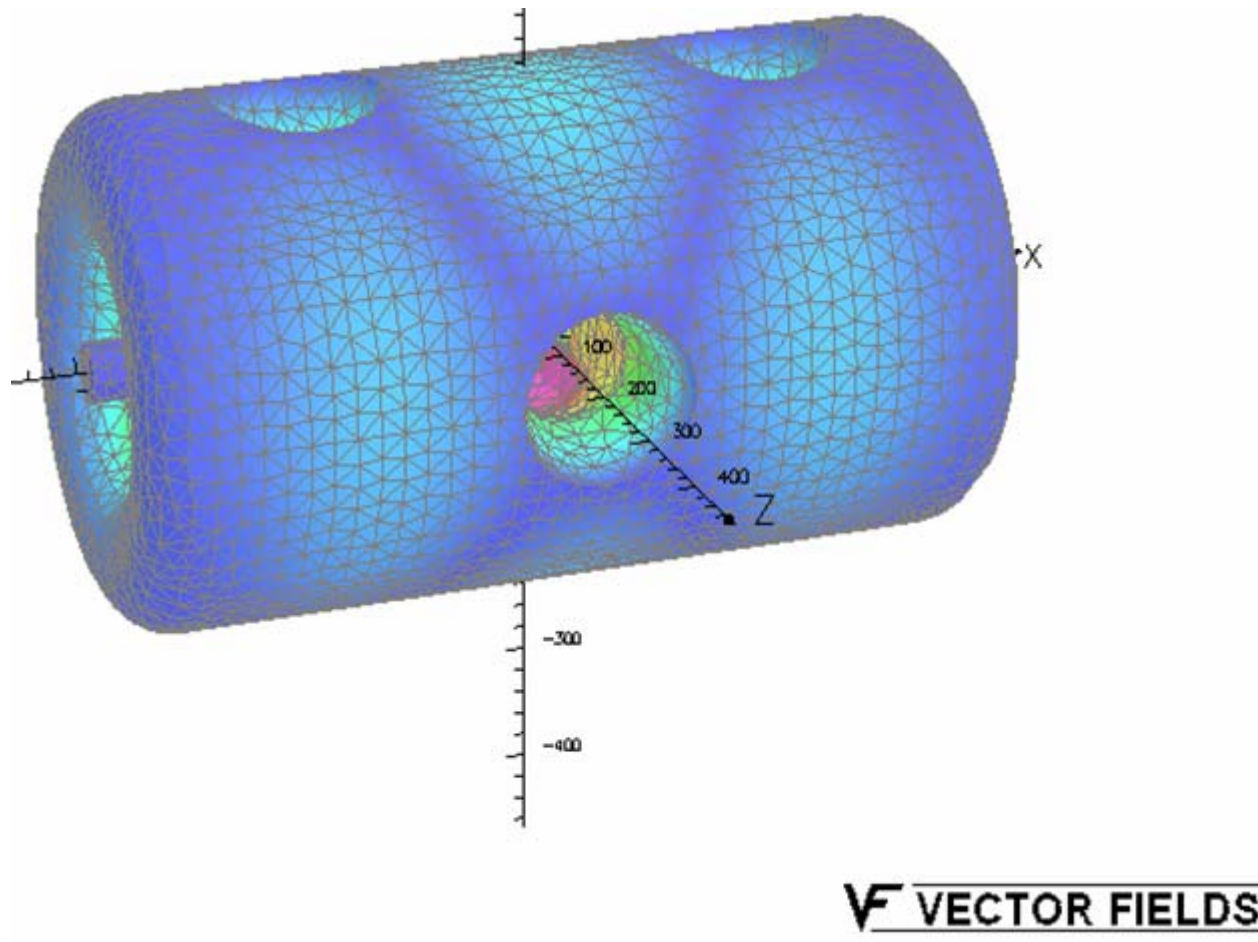


Magnetic field simulated with Opera3D/SOPRANO

100



Electric field simulated with Opera3D/SOPRANO



Mechanical analysis

E-H fields

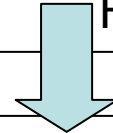
OPERA 3D



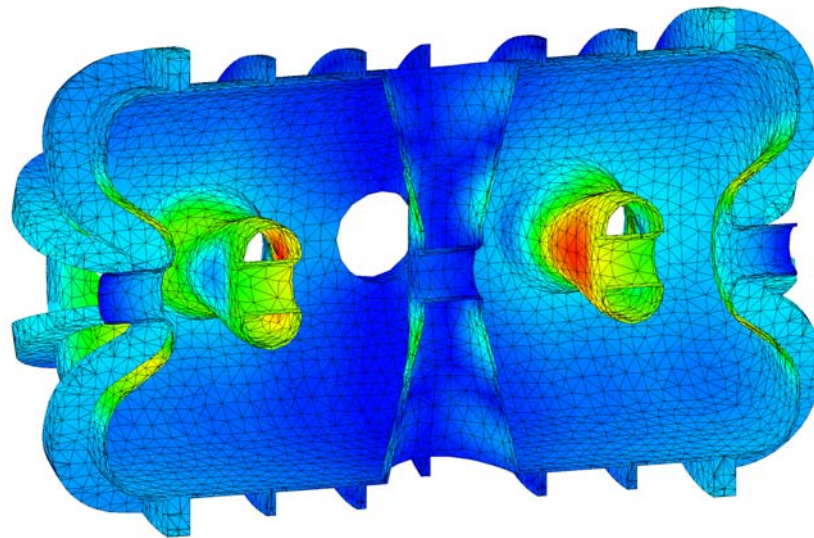
OperaToCast3m

ipn programs

H. Gassot



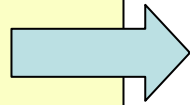
Deformation due to Lorentz forces



Cast3M

Resonance frequency shift

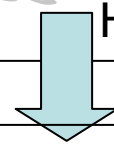
Mechanical
deformations
Cast3m



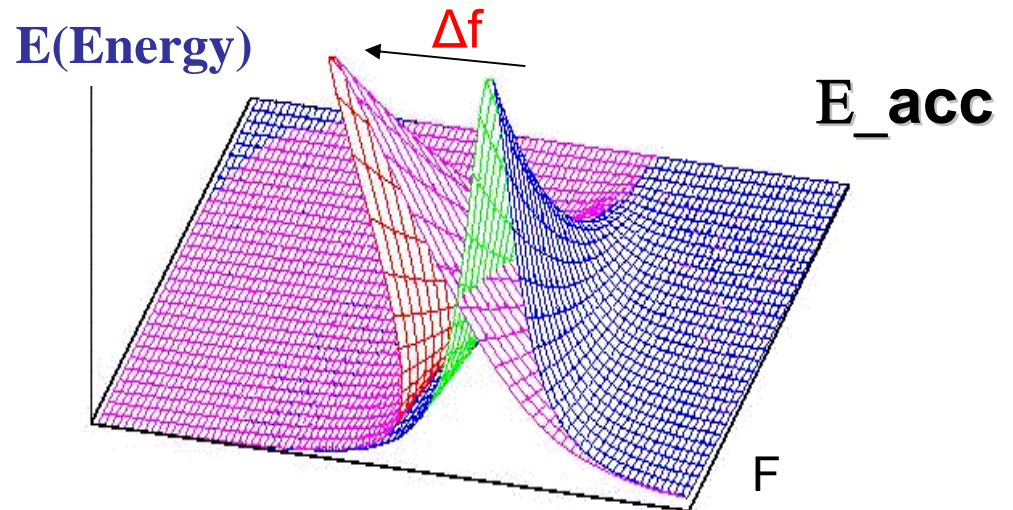
Cast3m To Soprano

Ipn programs

H. Gassot

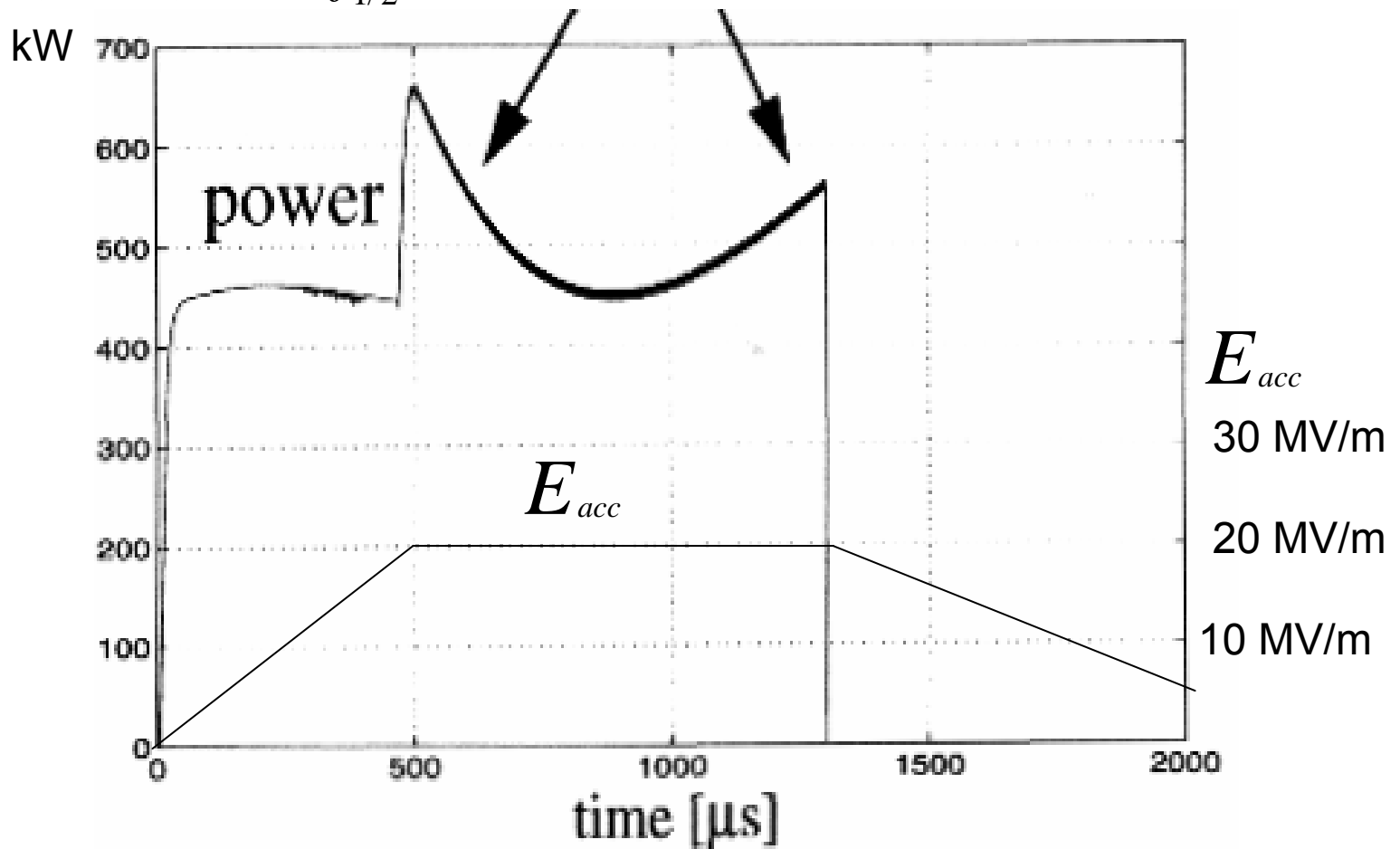


Resonance frequency shift of
superconducting cavity



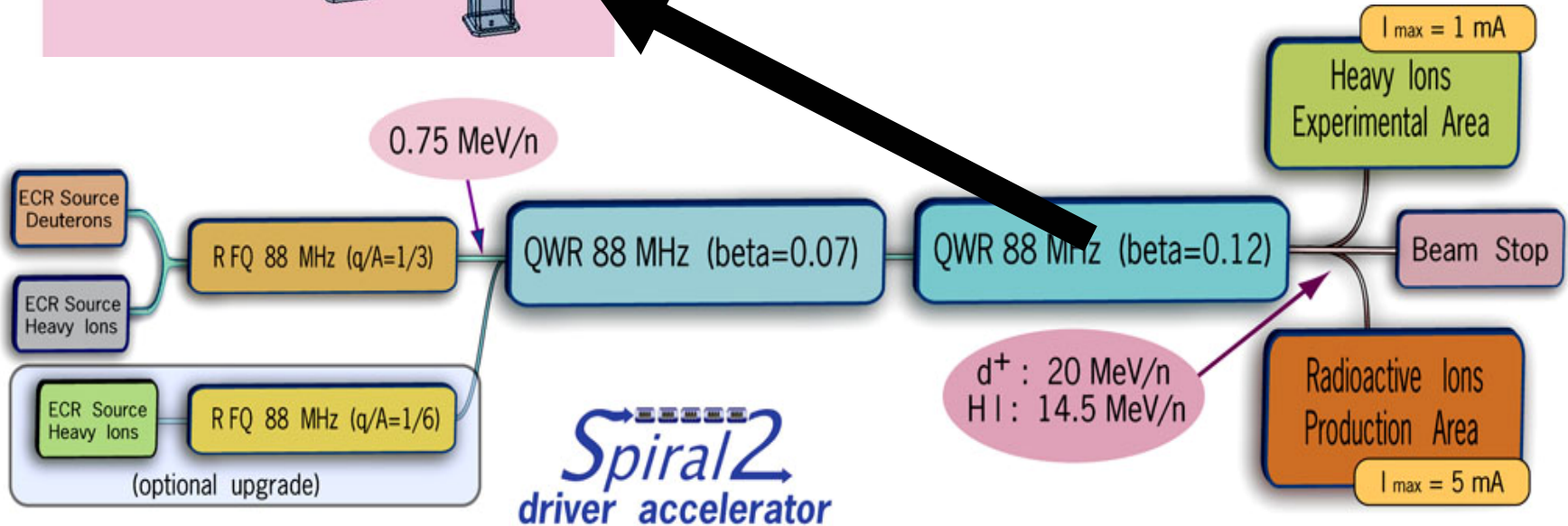
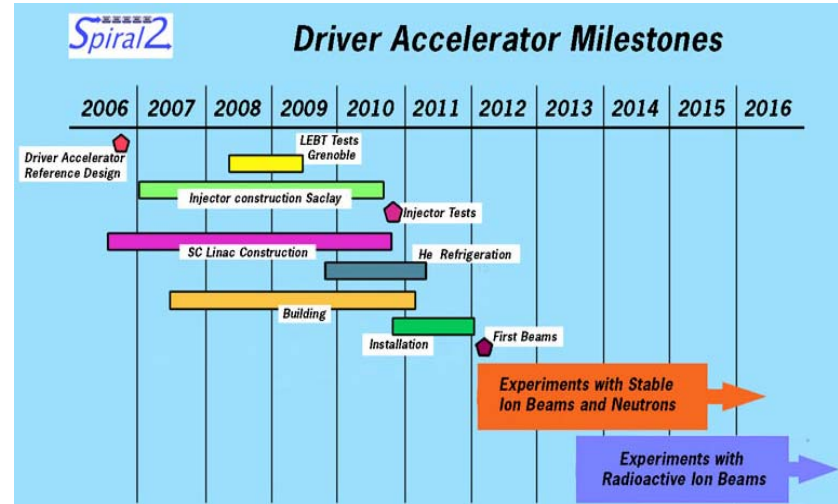
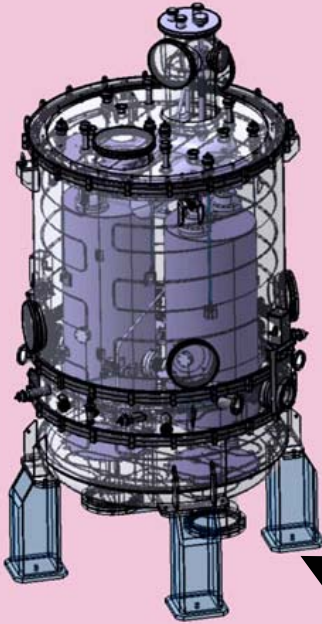
POWER LOSS

$$\frac{P_{\text{compositio}}}{P(\Delta f = 0)} = \frac{1}{4} \left(\frac{\Delta f}{\Delta f_{1/2}} \right)^2 \propto K^2 E_{acc}^4$$

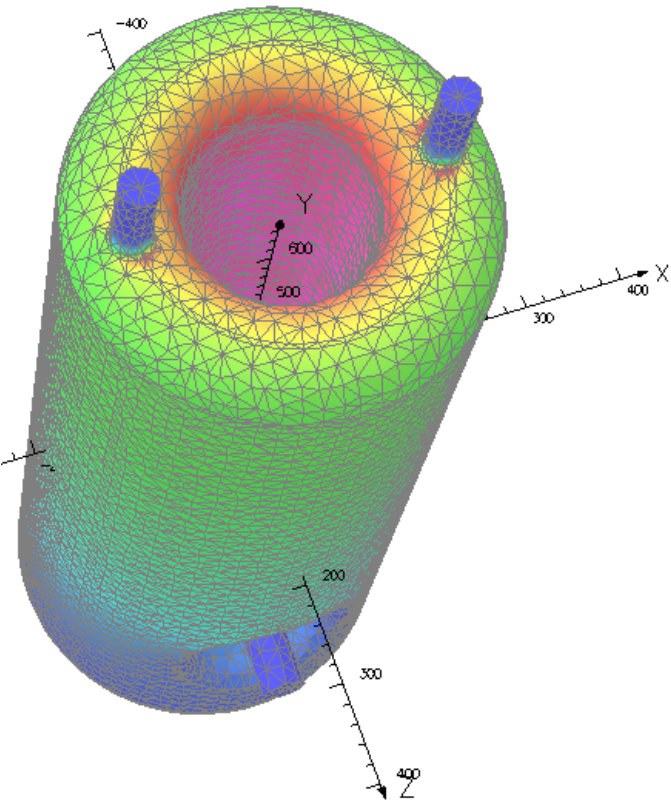
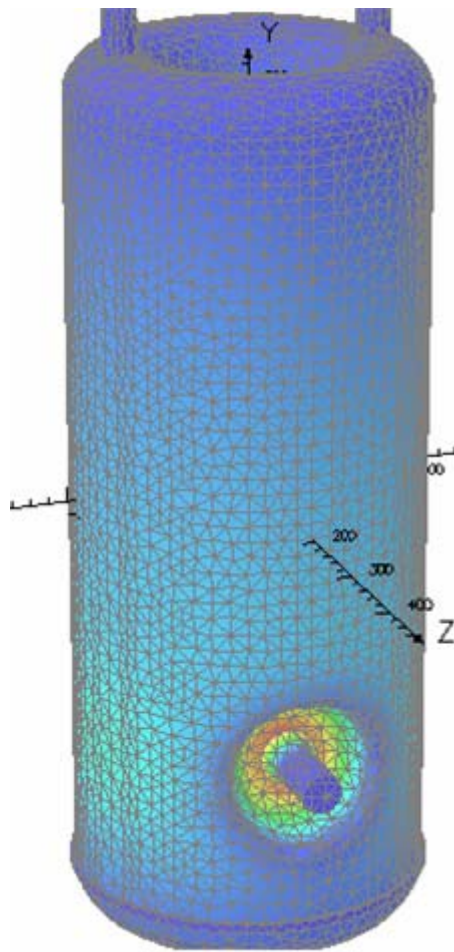
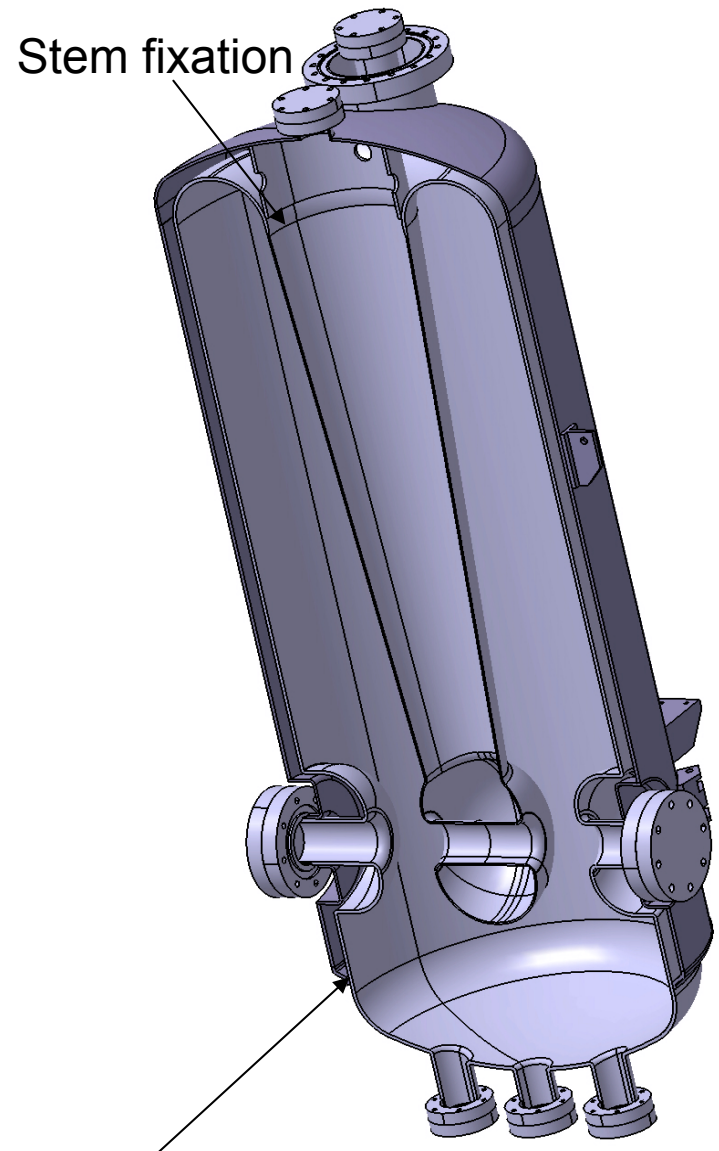


QWR Superconducting Cavity Design

$\beta=0.12$	
$\frac{E_{\text{peak}}}{E_{\text{acc}}}$	5.5
$\frac{B_{\text{peak}}}{E_{\text{acc}}}$	10.1 mT/(MV/m)
$\frac{R_s}{Q}$	521 Ω
$Q_0 \times 10^9$	1.7



Cavity Design and E-H Fields



Cylinder fixation

Cavity Design and E-H Fields

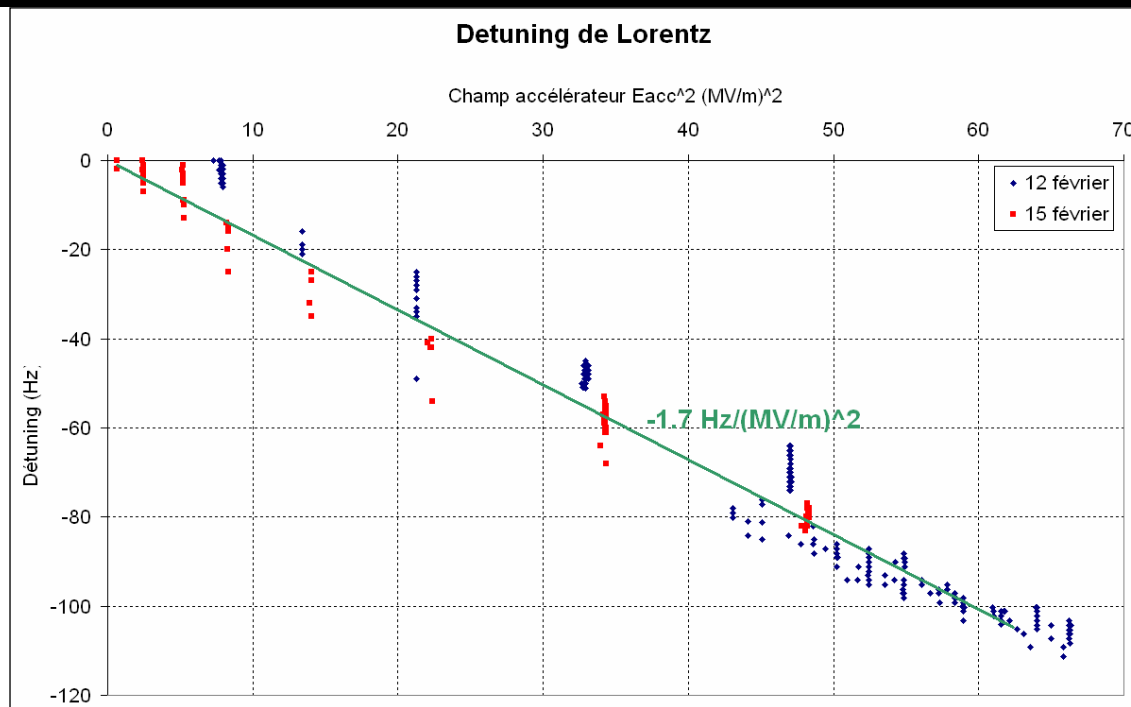
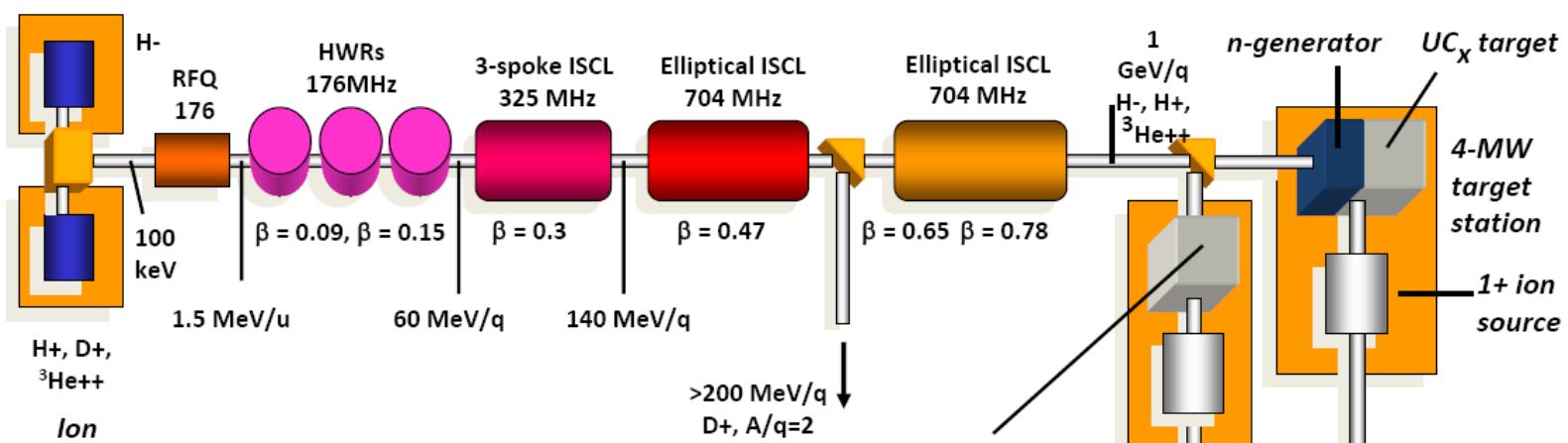


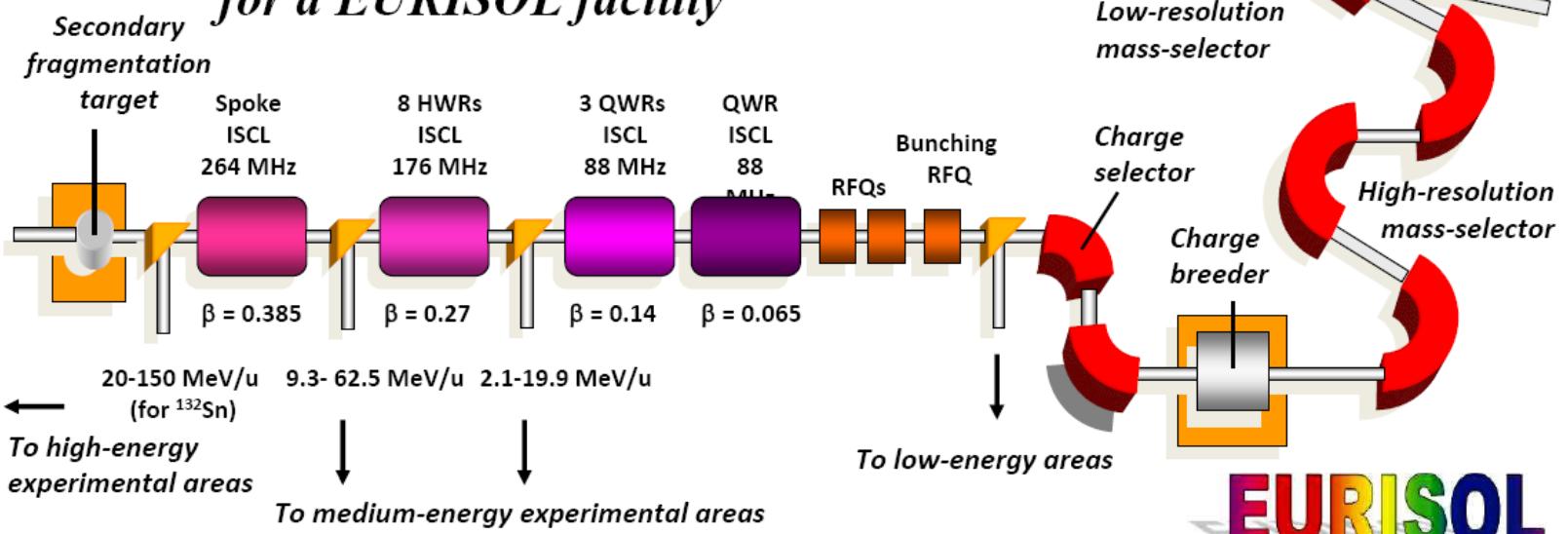
Figure 23 : Detuning de Lorentz mesuré dans le cryomodule (février 2008)

Results of simulations

Boundary conditions	$\Delta f / E_{acc}^2$
Stem and cylinder fixed	-1.1 (Hz/(MV / m) ²)
Cylinder fixed only	-2.72 (Hz/(MV / m) ²)

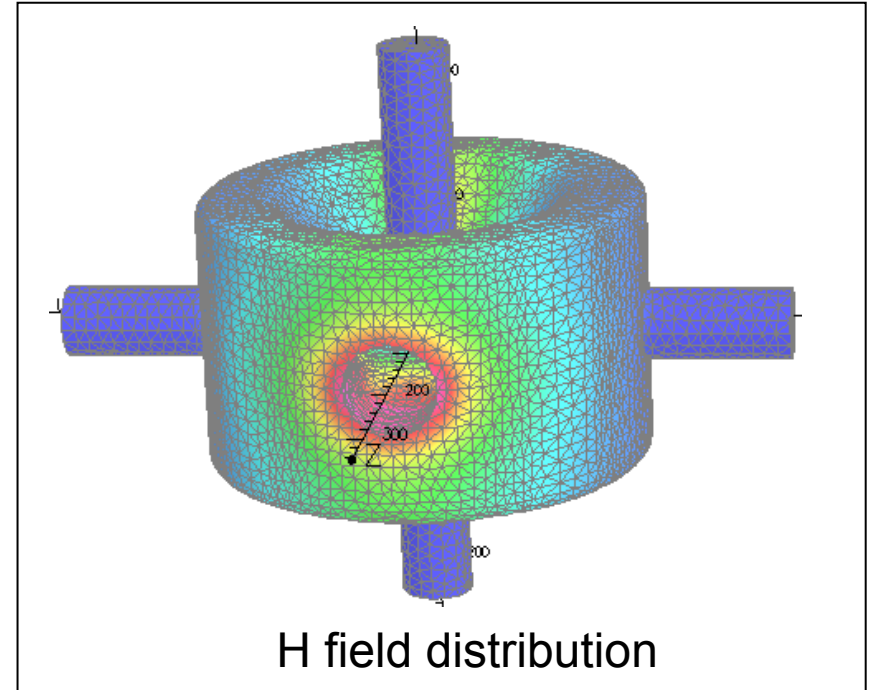
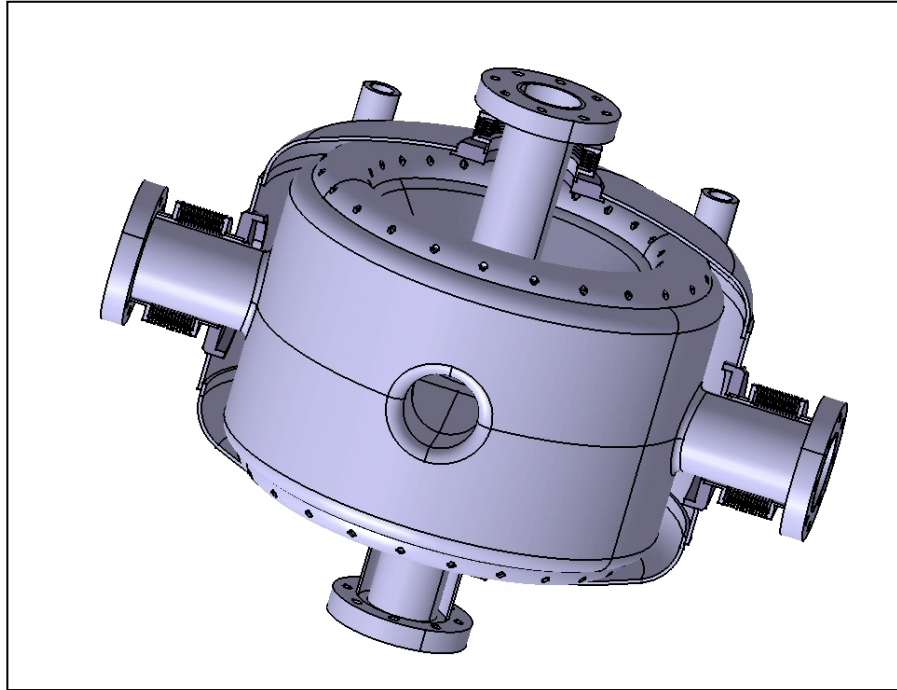


A possible schematic layout for a EURISOL facility

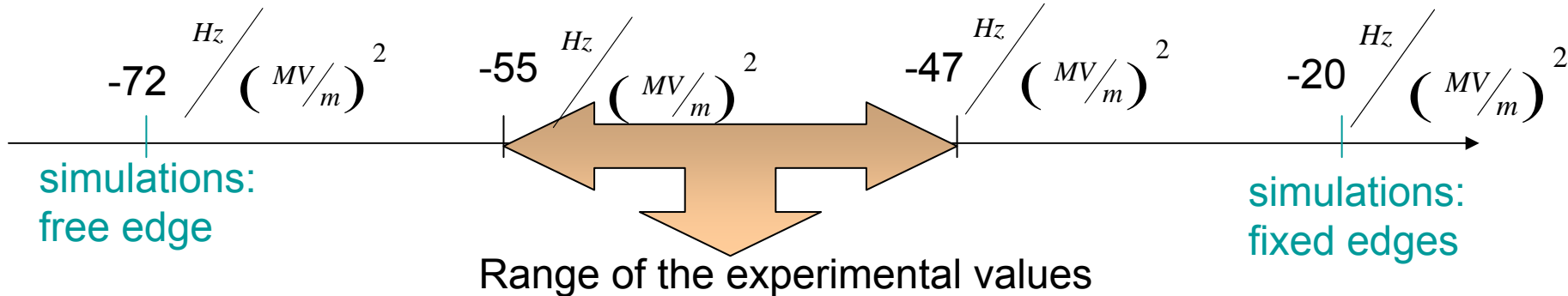


EURISOL

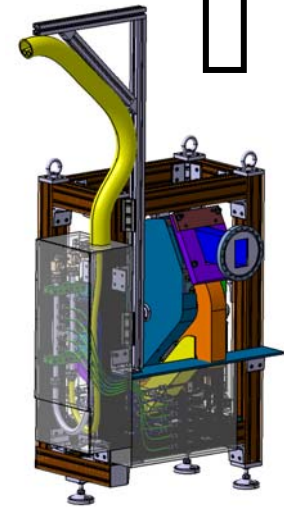
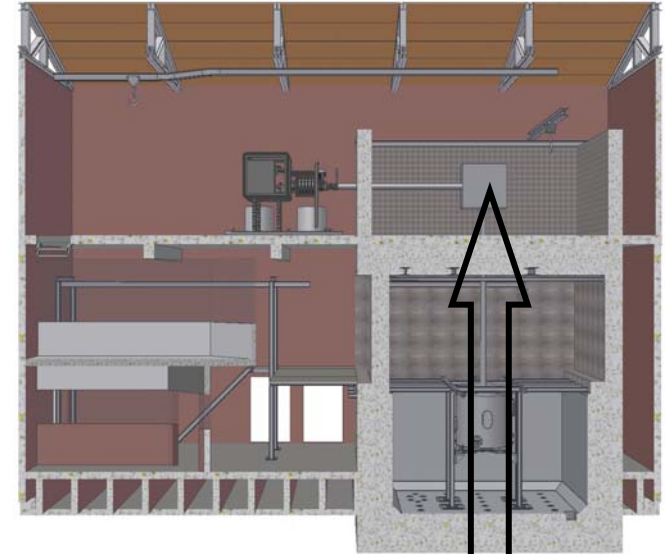
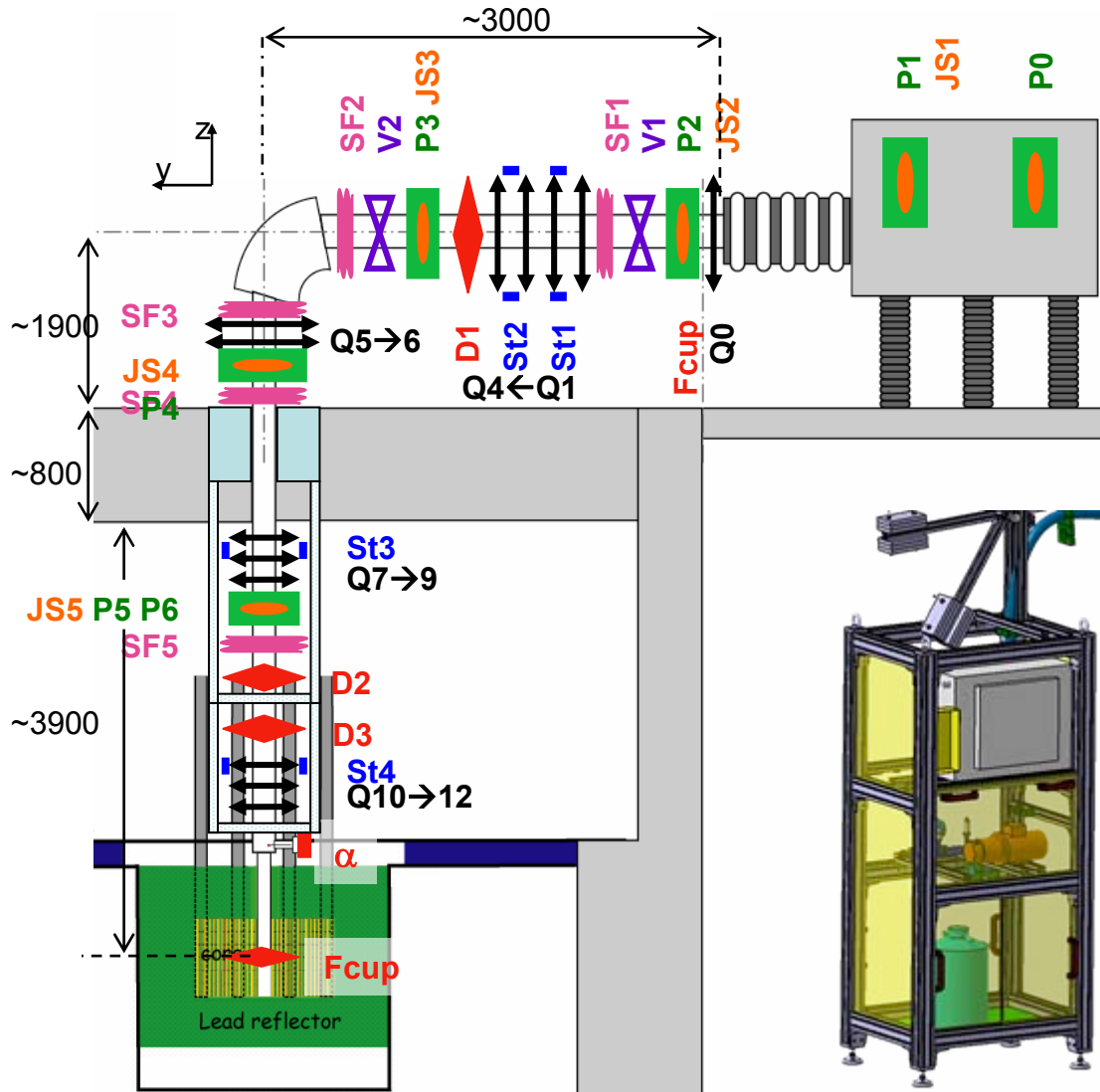
$\beta=0.15$ Spoke Cavity



Without stiffening rings

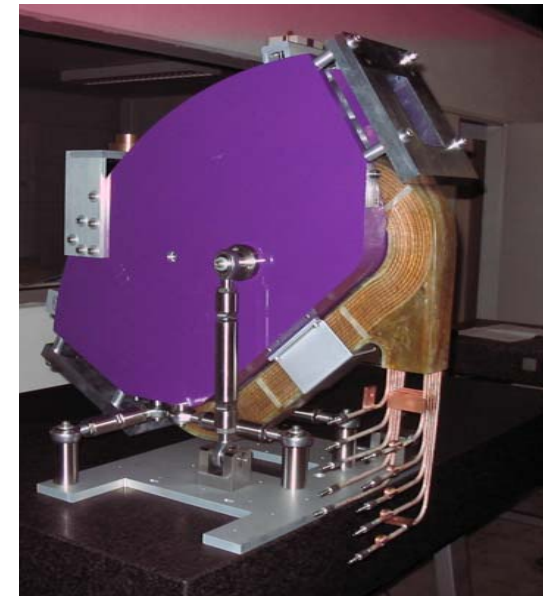
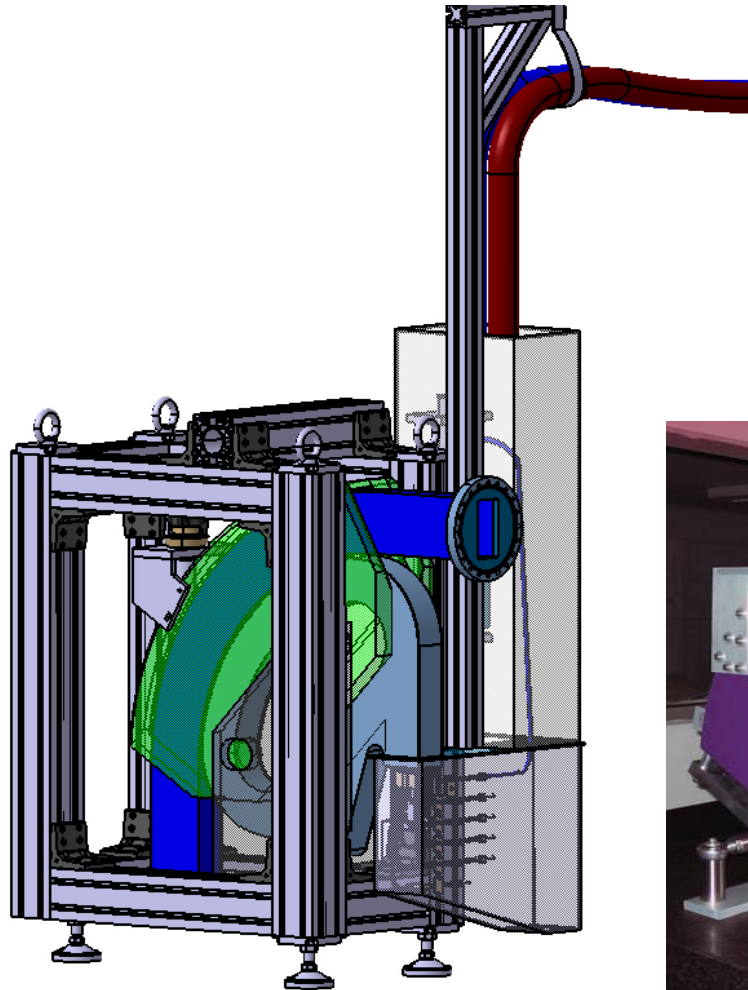
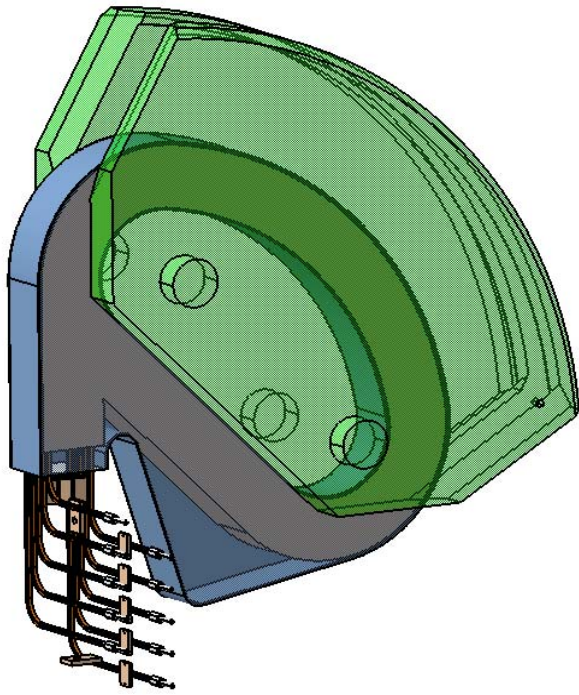


Guinevere : Dipôle 90°



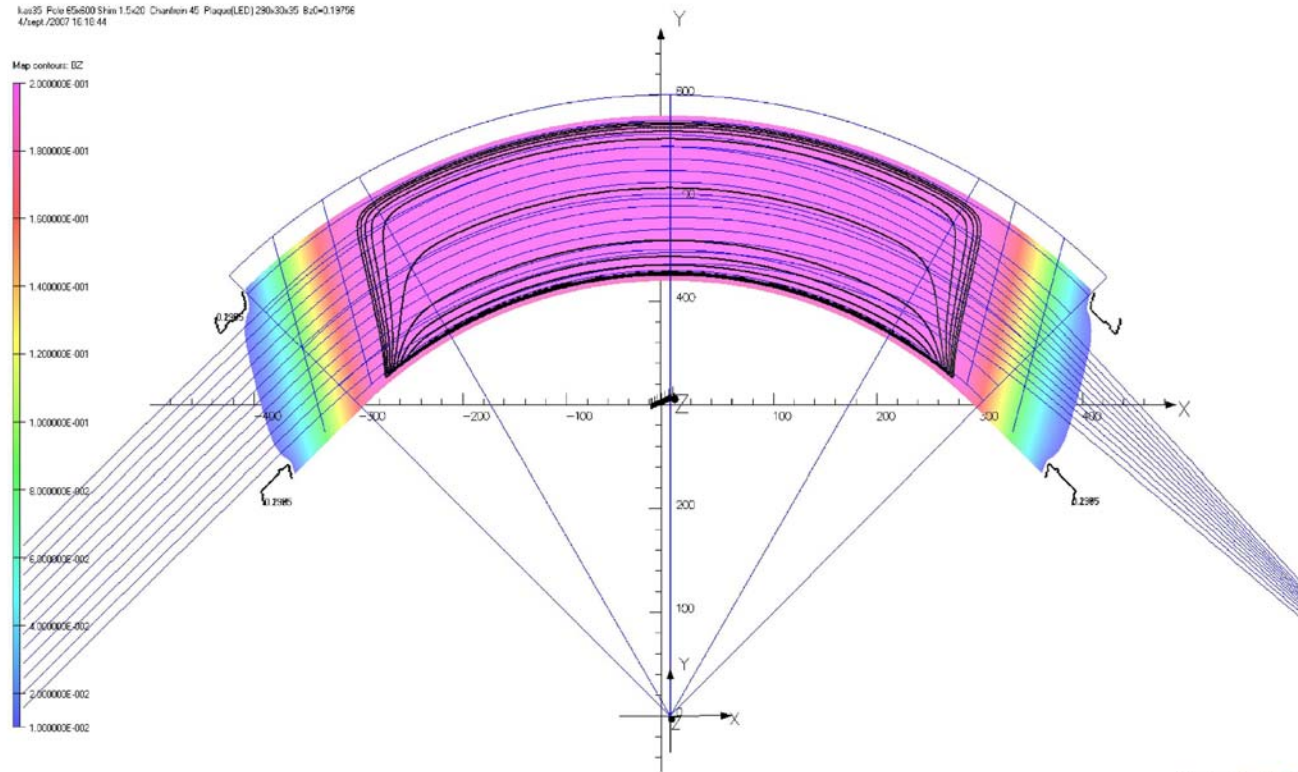
Generator of Uninterrupted Intense Neutrons at the lead VEnus Reactor

C- Magnet for GUINEVERE

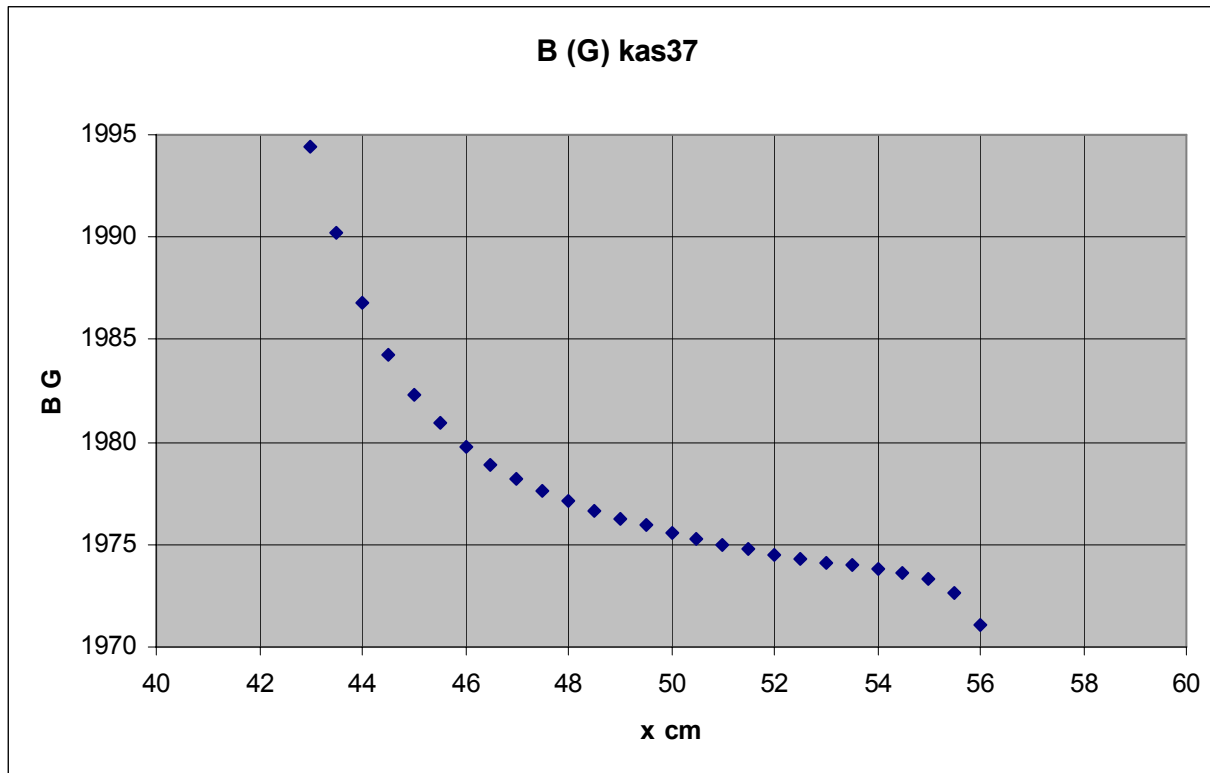


Raytracing in TOSCA Field by ZGOUBI

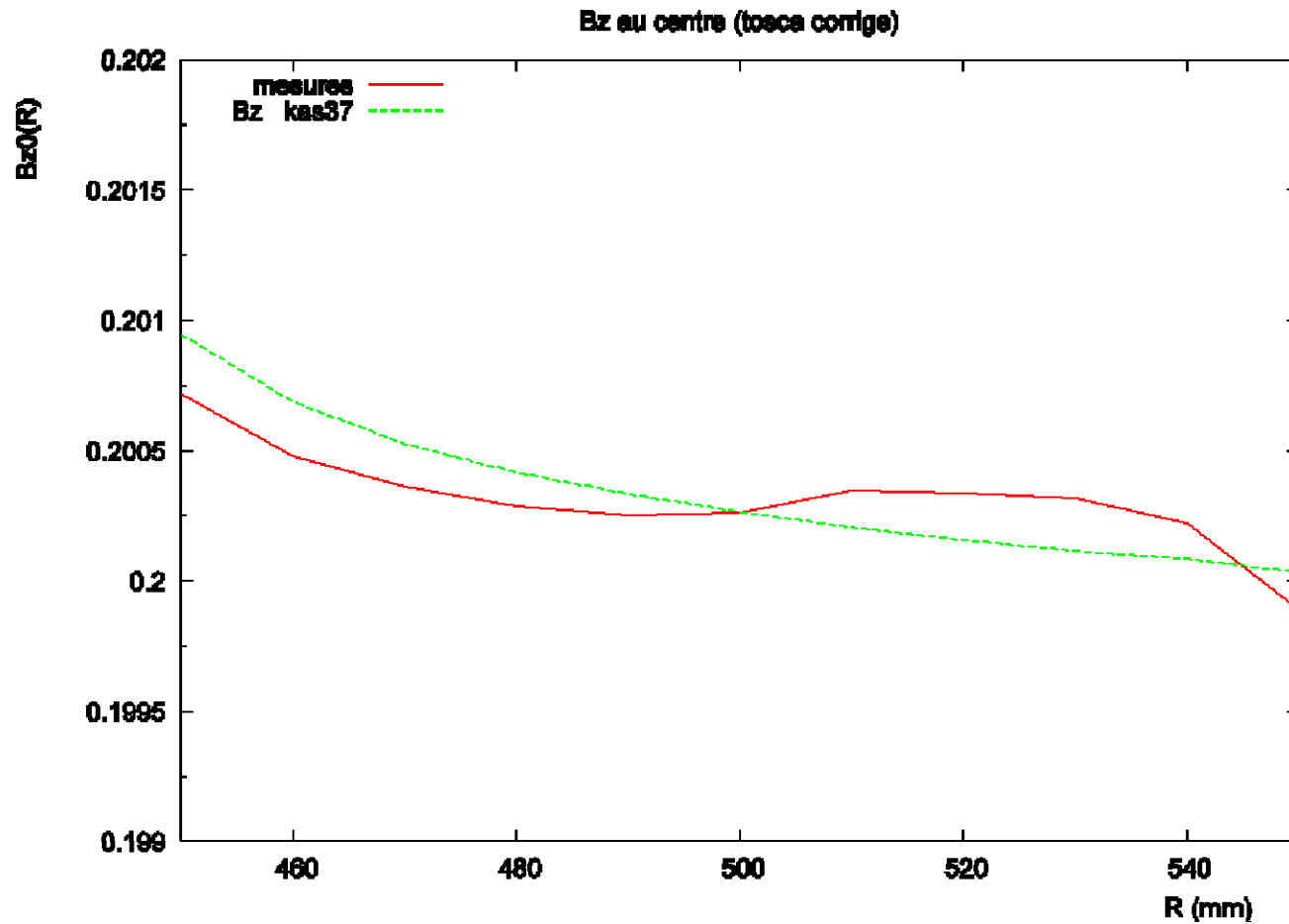
1st Order Matrix + position



B on axis (TOSCA)

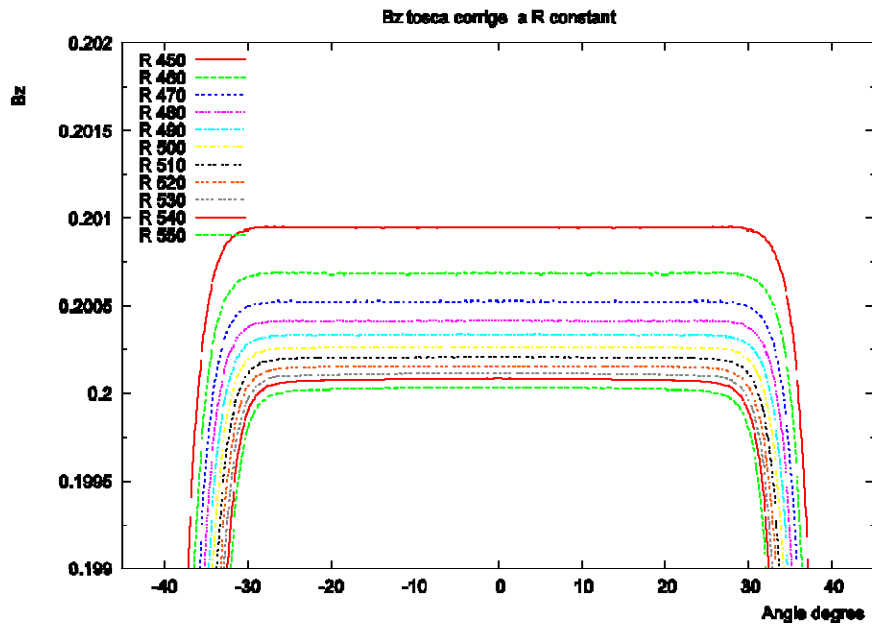


Measurements/Calculation



Along central trajectory

TOSCA



Measurements

