Wrocław University of Technology

EuCARD WP 7 – High Field Magnets
Task 2 – Support studies

Task 7.2.1 – Irradiation Study

Status report

Maciej Chorowski, Jaroslaw Polinski, Piotr Bogdan

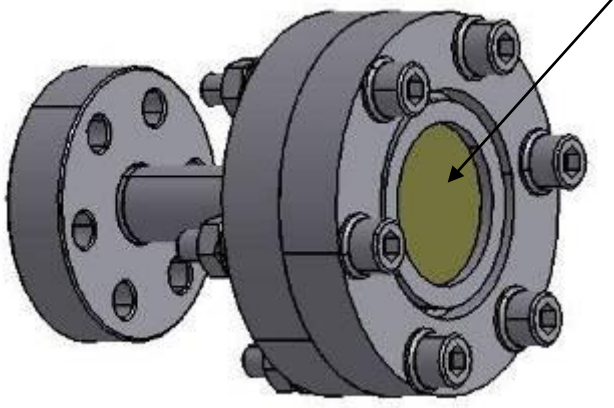
Faculty of Mechanical and Power Engineering

EuCARD WP7 Collaboration Meeting – 15.11.2011

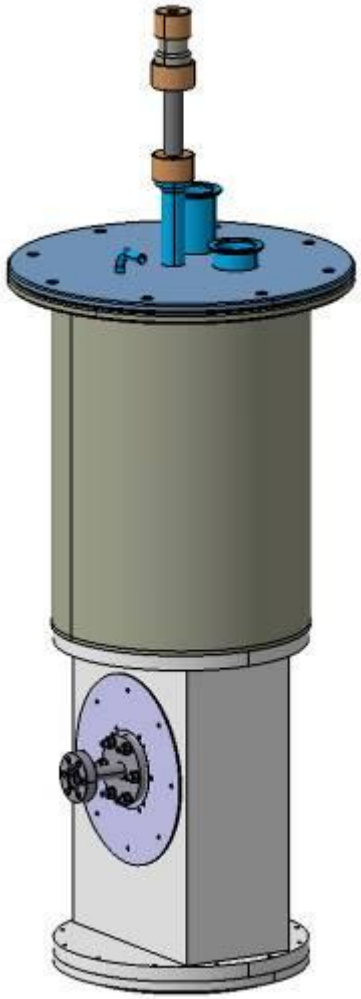
Outline

- Irradiation cryostat status
- Sample irradiation time scale
- Mechanical certification tests
- Task 7.2.1 summary

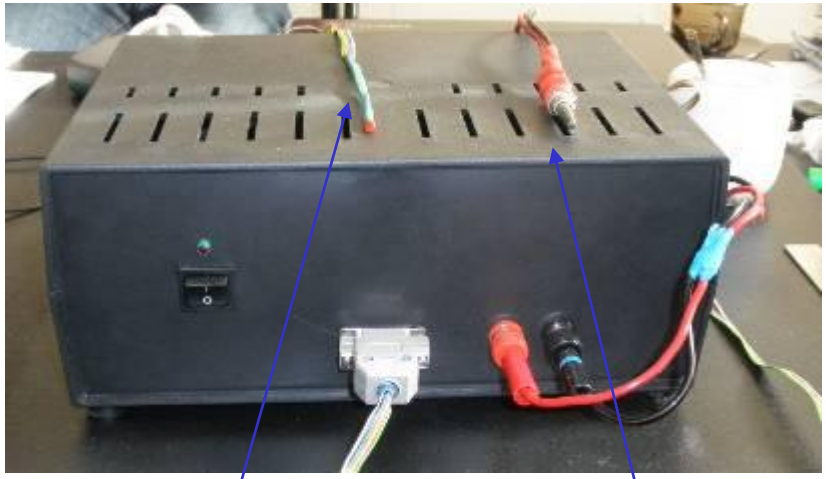
Conceptual design of the irradiation cryostat



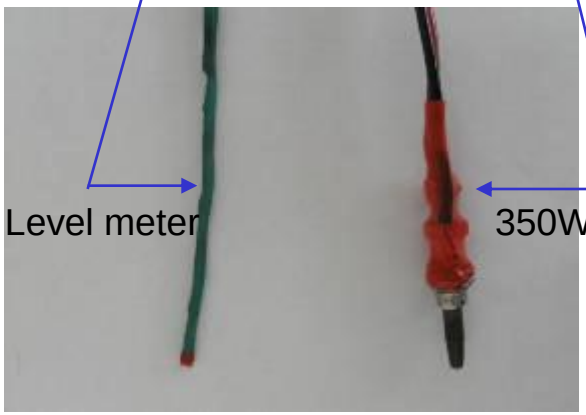
0.02 mm thick Ti window
(probably higher dose rate
to be measured week 46-47)



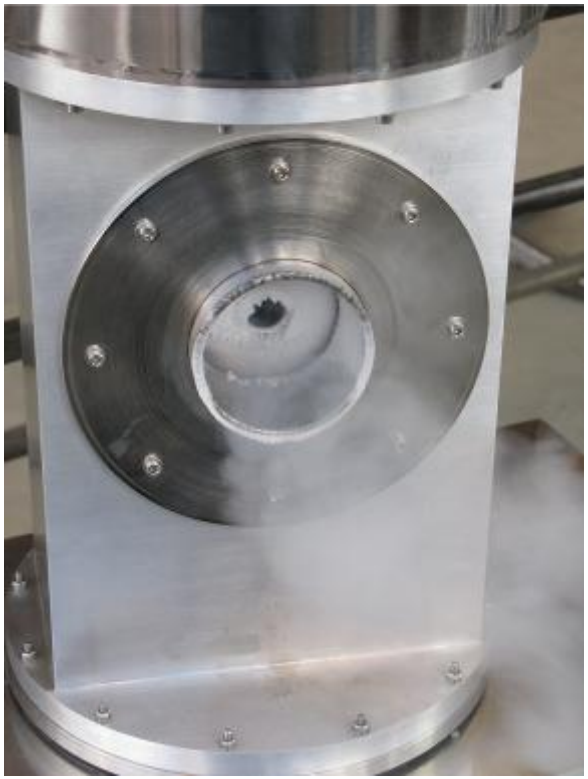
LN2 level regulation system for irradiation cryostat



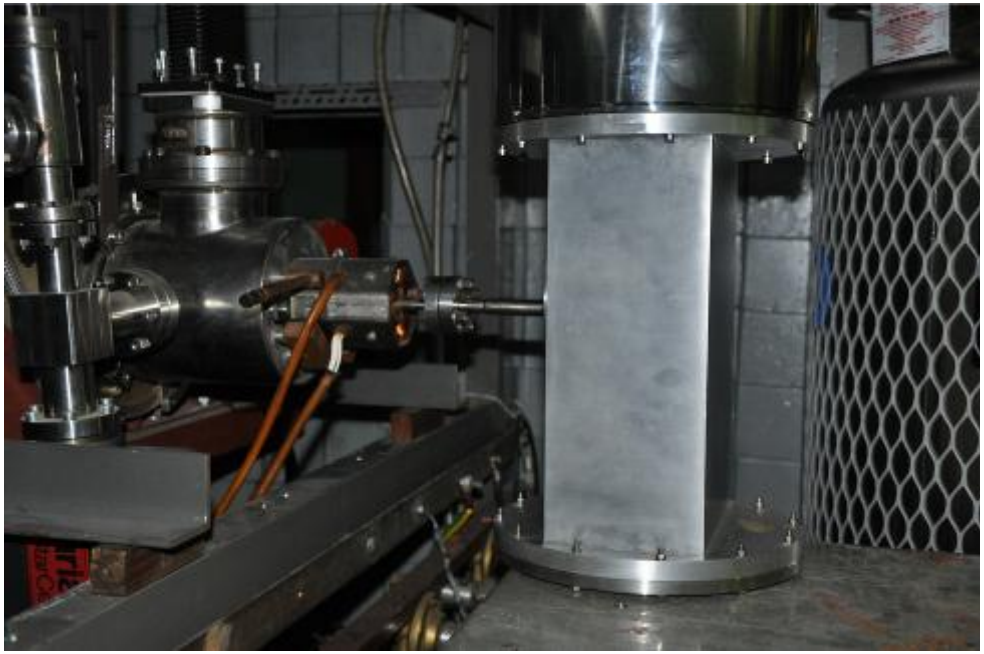
Level regulation system



Irradiation cryostat – commissioning test at manufacturer site



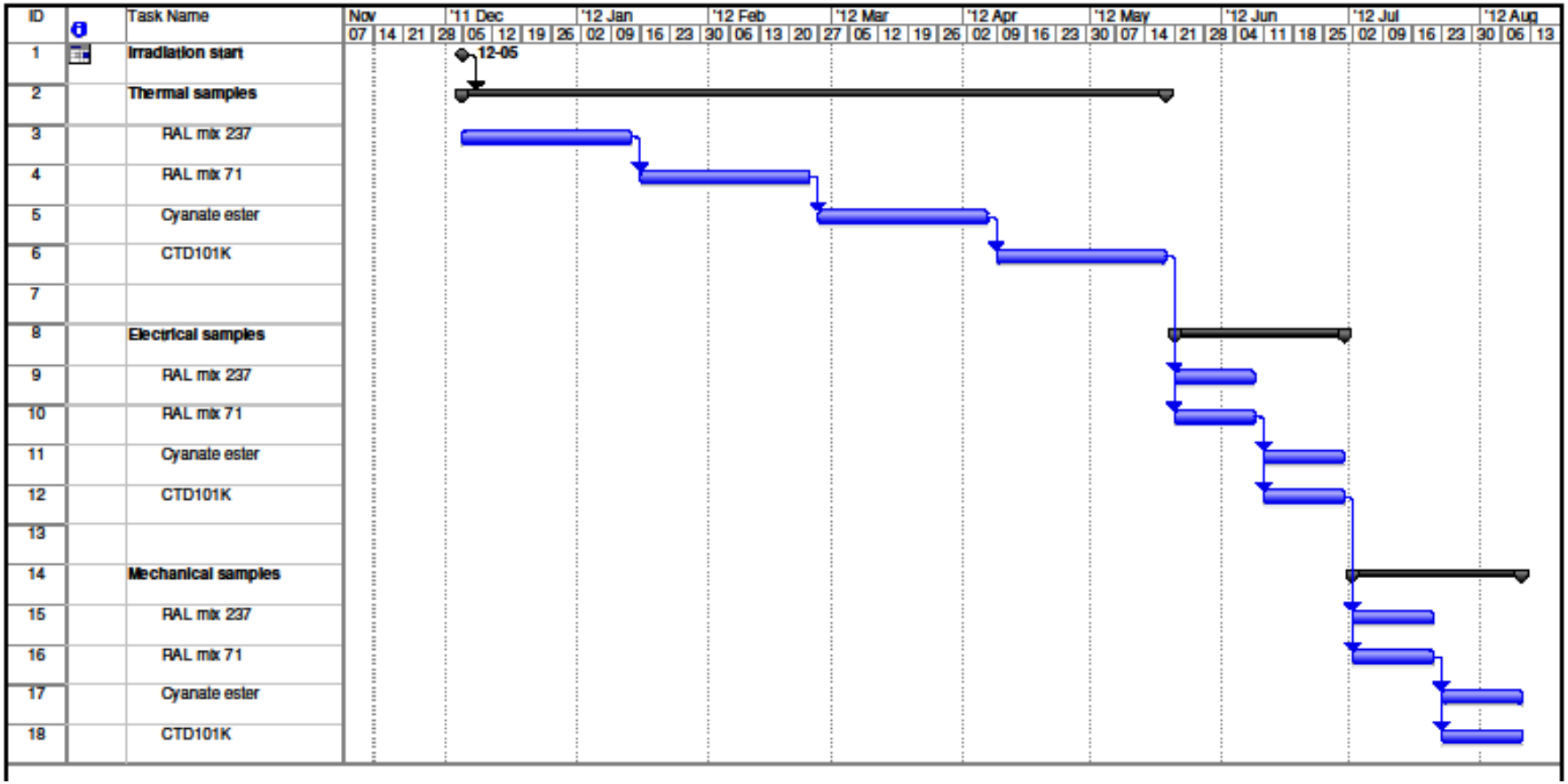
Irradiation cryostat installation at NCBJ



Irradiation cryostat status

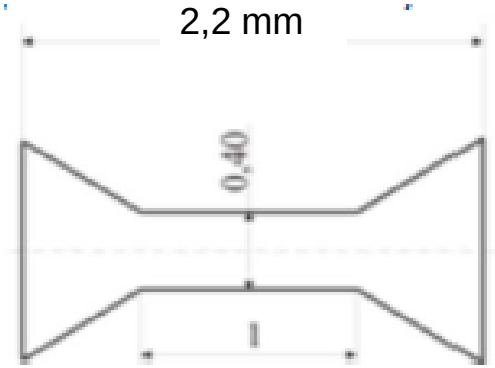
- Irradiation cryostat is commissioned, transported and installed in NCBJ, Swierk
- A new 0.02 mm Titanium accelerator window installation and dose rate tests are foreseen for week 46-47
- Start of irradiation test with G10 sheets is foreseen for week 47
- Start of insulation irradiation – week 49

Irradiation time scale



Mechanical tests - microsamples

- Tensile tests on microsamples:

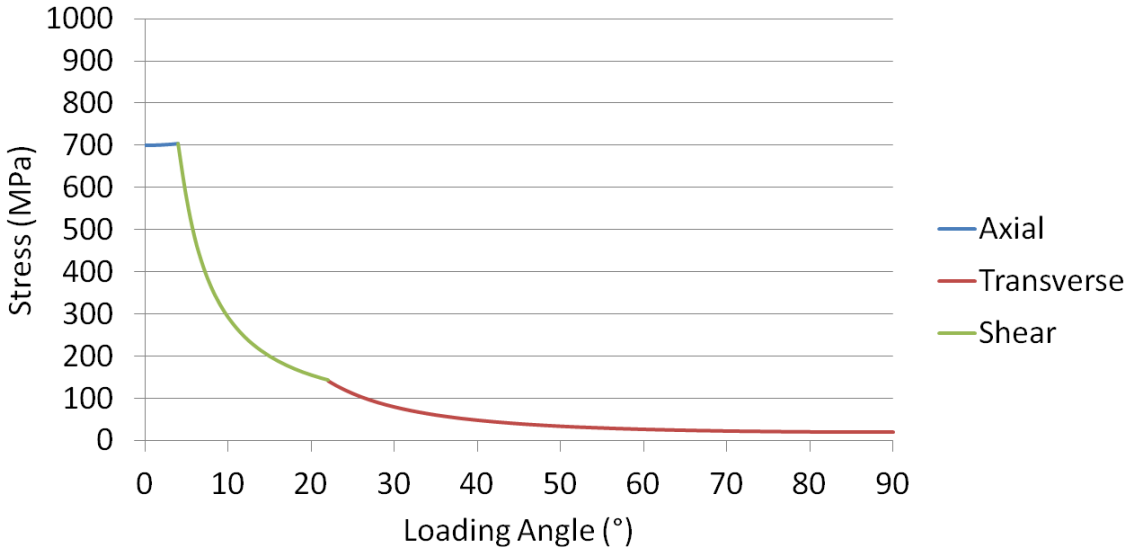


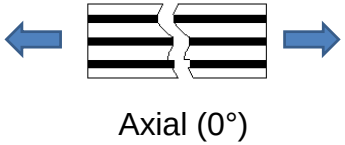
- Micro-bendig tests – sample's dimensions: 8 mm x 3-4 mm of thickness
- Microtomography
- Thermal analysis:
  - DSC – Differential Scanning Calorimetry
  - TGA – ThermoGravimetric Analysis
  - DMA – Dynamic Mechanical Analysis

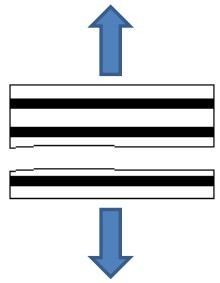
Mechanical tests methods of laminates

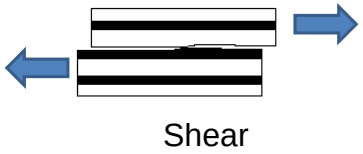
Science & Technology Facilities Council
Technology

Failure stress dependence on loading angle using maximum stress criterion

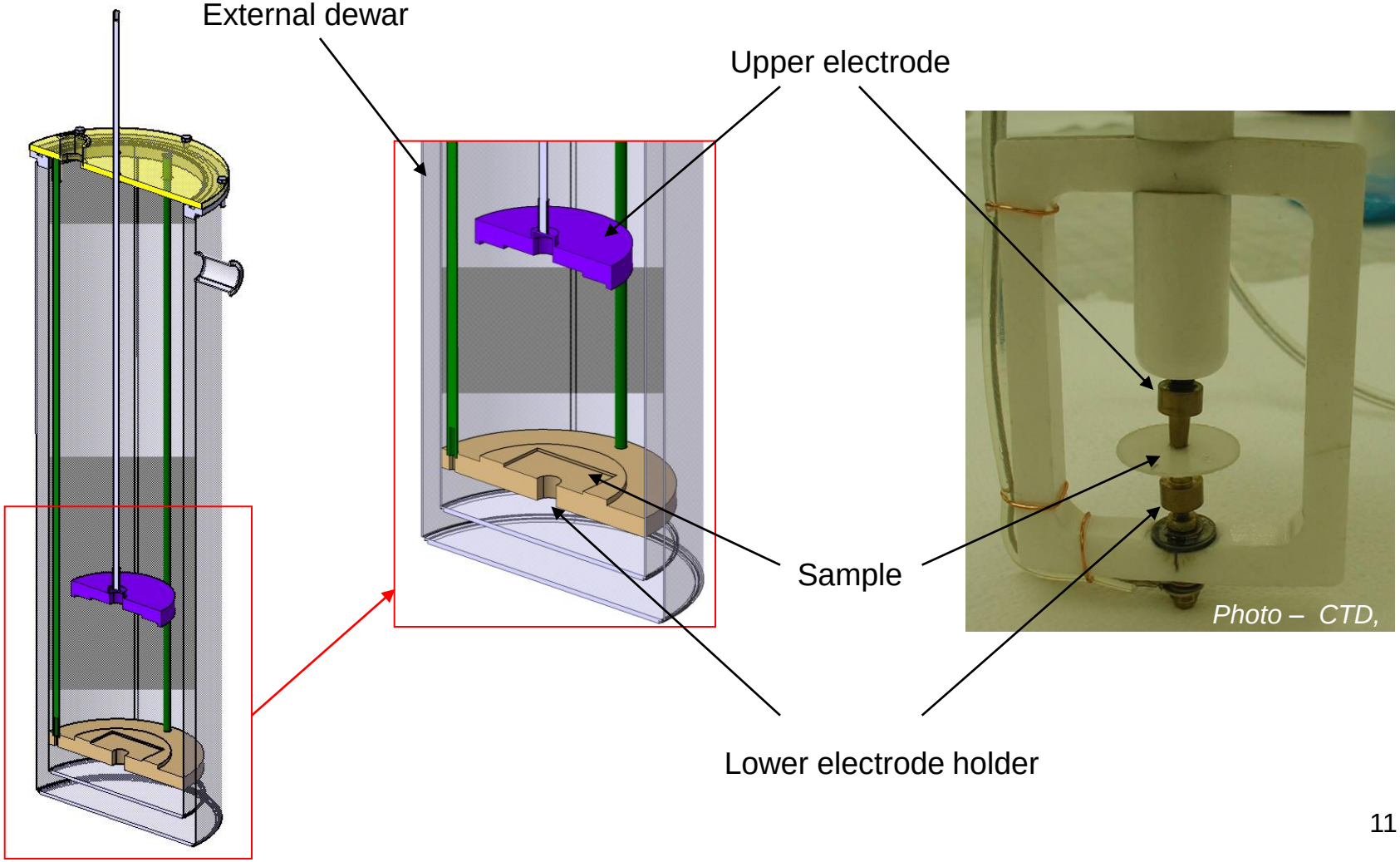






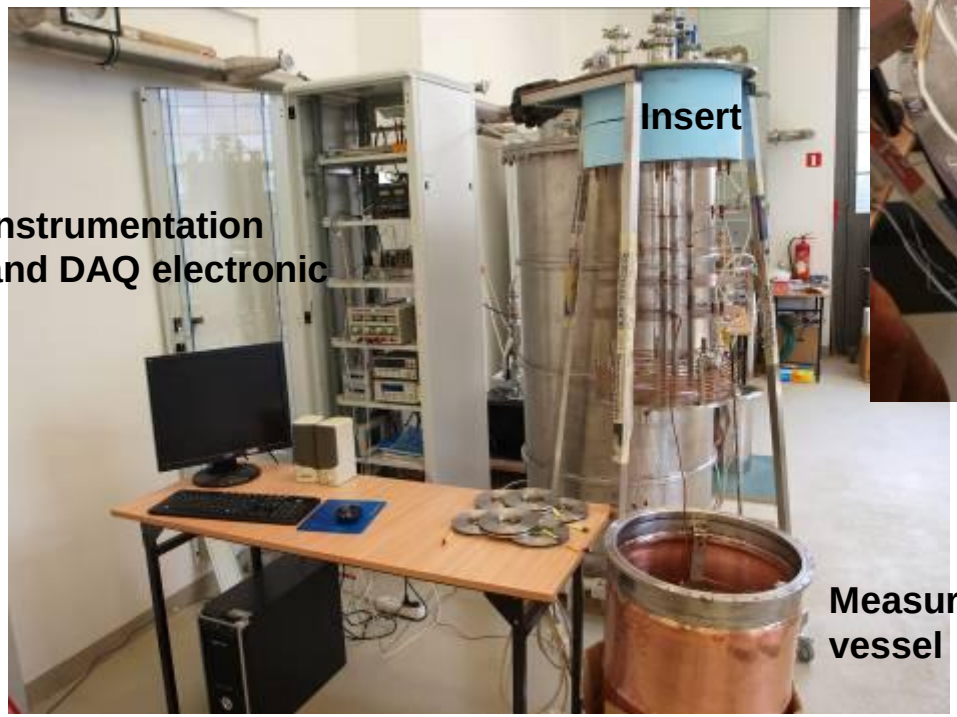


Electrical certification cryostat - conceptual design (in progress)



PWR thermal study status – details in presentation of B. Baudouy

Top view of the cryostat with wiring



Task 7.2.1 plan

Achieved Oct 2010

„Sample test map” report

Achieved Nov 2011

M 7.2.1 has been delivered

EuCARD WP 7: HFM Task 2 Start = 01/04/09	1st year				2ed year				3td year				4th	
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14
	3	6	9	12	15	18	21	24	27	30	33	36	39	42
				EuC Rep				EuC Rep				EuC Rep		
Sub-task 2.1: Radiation resistance certification														
Methodology for coil radiation resistance certification								M(24)						D(42)
Determination of radiation types and doses	IM													
Determination of irradiated sample tests scope						IM								
Selection of the Institute capable of the irradiation						IM								
Test samples production														
Irradiated sample test set-ups preparation								IM						
Sample irradiation													IM	
Irradiated sample tests (mech+elec+therm)														IM

Achieved Oct 2010
„Sample test map” report

Achieved

SOLTAN Institute Warsaw has been selected

Achieved Nov 2011

Irr. cryostat is installed at NCBJ, Swierk

Studies | Manuf | Tests | **WP** - Work Package Report

M - Mileston | **IM** - Inter. Milestons | **D** - Deliverables | **EuC** - EuCARD Report

Task 7.2.1 Summary

- A formal agreement between PWR and TECHTRA for supply of irradiated materials (including irradiation) - signed in Oct 2011
- Milestone 7.2.1 (M24) „ Methodology for the certification of radiation resistance of coil insulation material" has been delivered
- Irradiation cryostat is commissioned, transported and installed in NCBJ, Swierk
- Samples irradiation: Dec 2011 – August 2012
- Conceptual design of dewar and insert for the electrical tests – in progress