

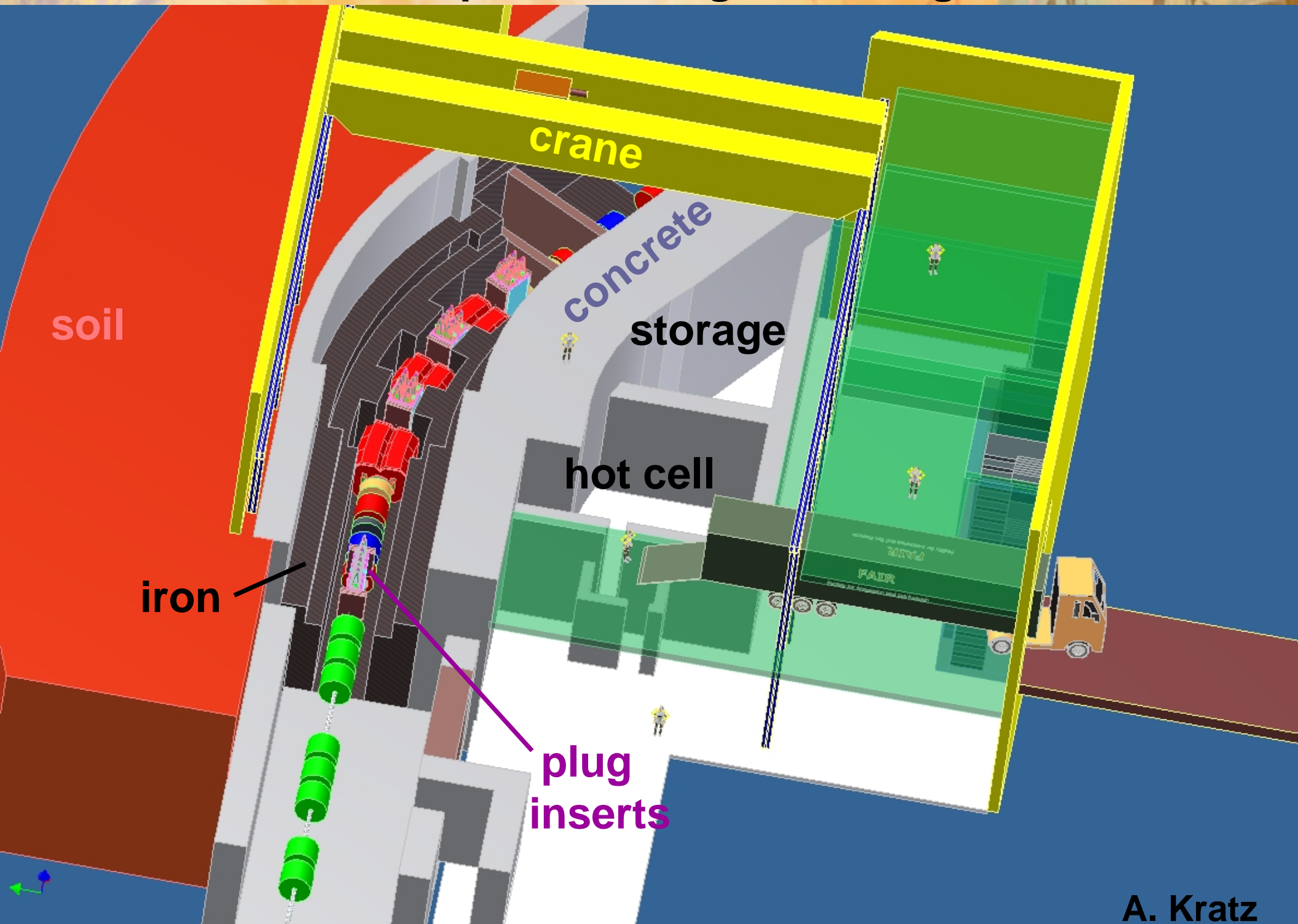
Eol for Super-FRS Target by GSI

Helmut Weick
Super-FRS Eol meeting
Darmstadt, 10th Oct 2008

- ❖ **Content of Eol**
- ❖ **Present Development**
- ❖ **Resources and Time Line**



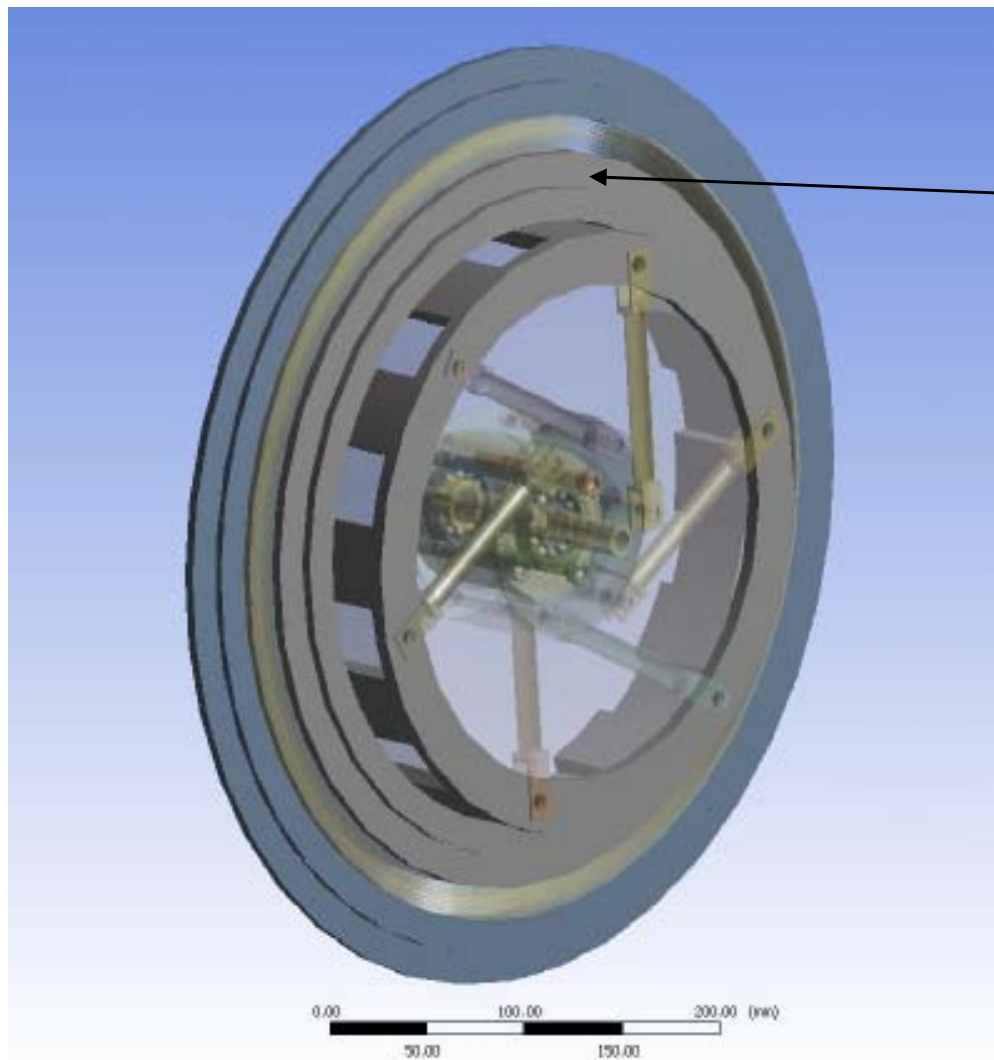
Super-FRS Target Building



The Eol in Cost Book Items

2.4.11.3	<i>Production Target</i>			
2.4.11.3.1	Target chamber	1	270.0	270.0
2.4.11.3.2	Graphite wheel assembly + spare1	1	270.0	270.0
2.4.11.3.3	Safety/transport container	1	450.0	450.0
2.4.11.3.4	Vacuum system	1	90.0	90.0
2.4.11.3.5	Cooling system	1	108.0	108.0
2.4.11.3.6	Storage cell for target	1	180.0	180.0
2.4.11.3.7	Hot cell	1	1350.0	1350.0
2.4.11.3.8	Detector feed-throughs	2	45.0	90.0
2.4.11.3.9	Slit system (x)	1	72.0	72.0
2.4.11.3.10	Crane (20 tons) + control	1	270.0	270.0
2.4.11.3.11	Pillow seals	2	7.2	14.4
2.4.11.3.12	Fe+X shielding material (26 ton)	15	4.5	67.5
2.4.11.3.13	Alignment tools	1	90.0	90.0
2.4.11.3.14	Jet target assembly (rough estimate)	1	450.0	450.0
			sum / k€	3771.9

GSI concept for slow-extraction target



Solid graphite
SGL Carbon R 6400P
5 steps, 1 – 8 g/cm²

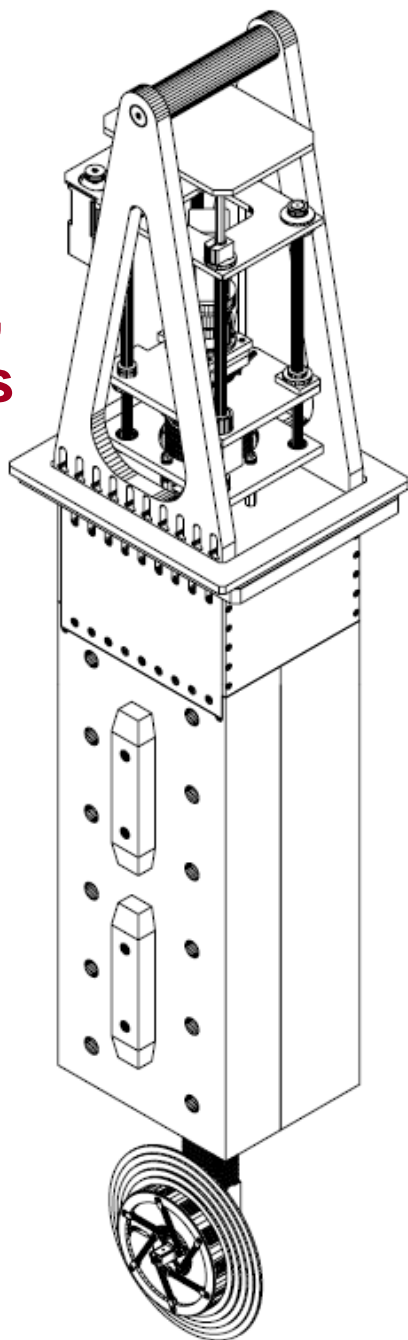
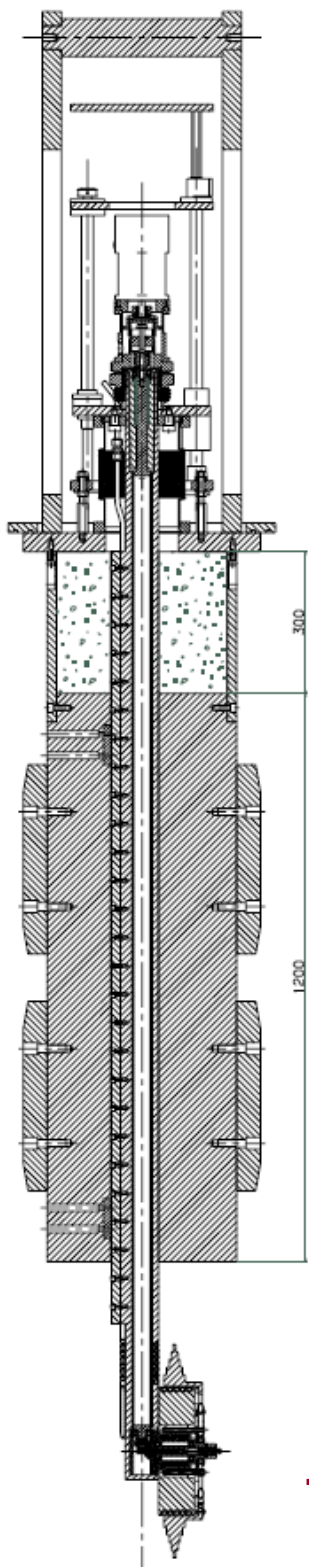


hook

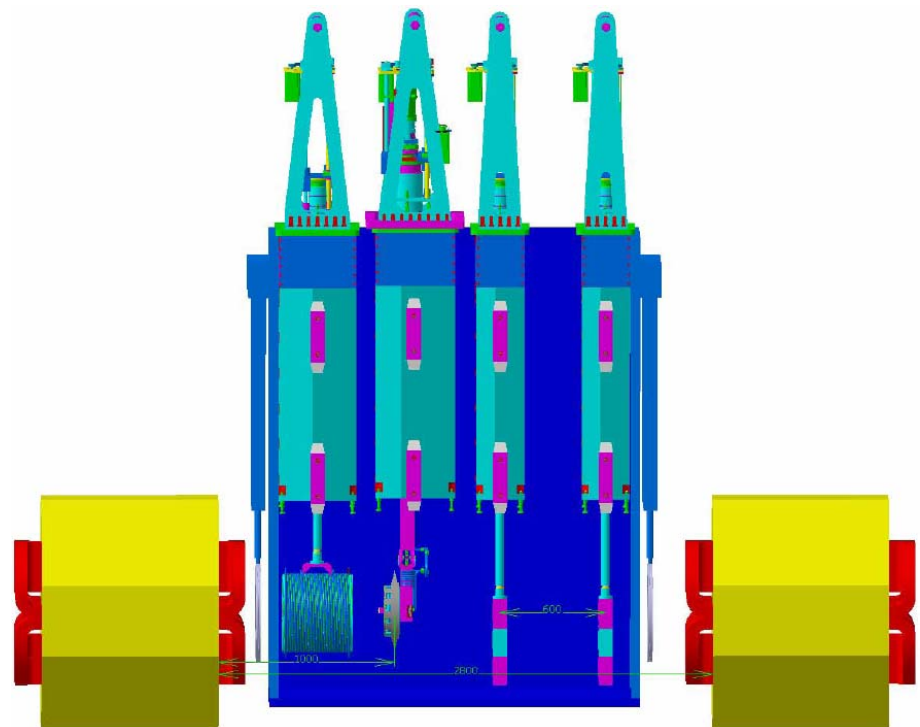
**drives,
motors**

**iron
plug**

target wheel



Target Plug



target chamber

Martin Gleim

Transport Bottle



Kraftanlagen
Heidelberg GmbH
GAH Gruppe

Traverse with
sliding lid

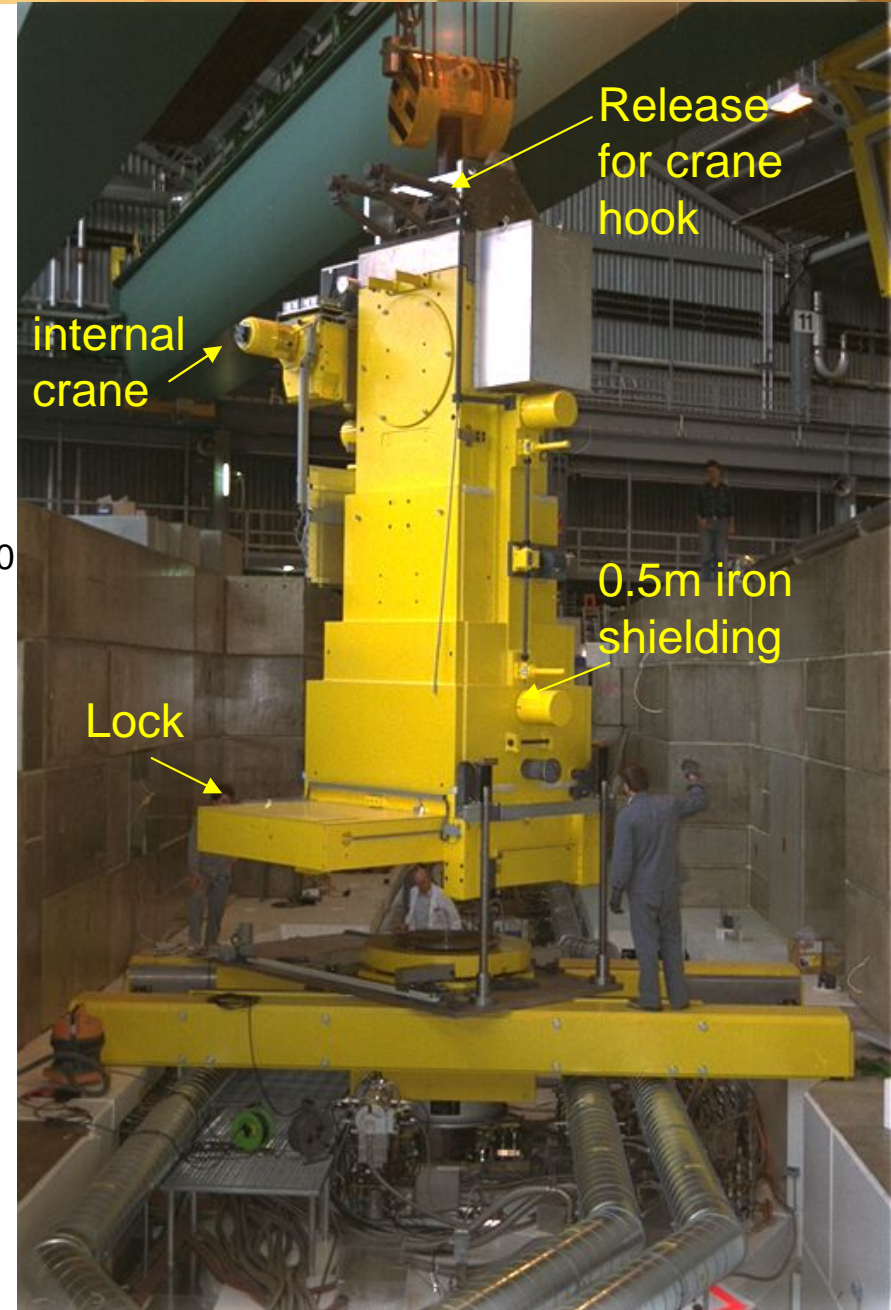


5600
mm



2190

1800

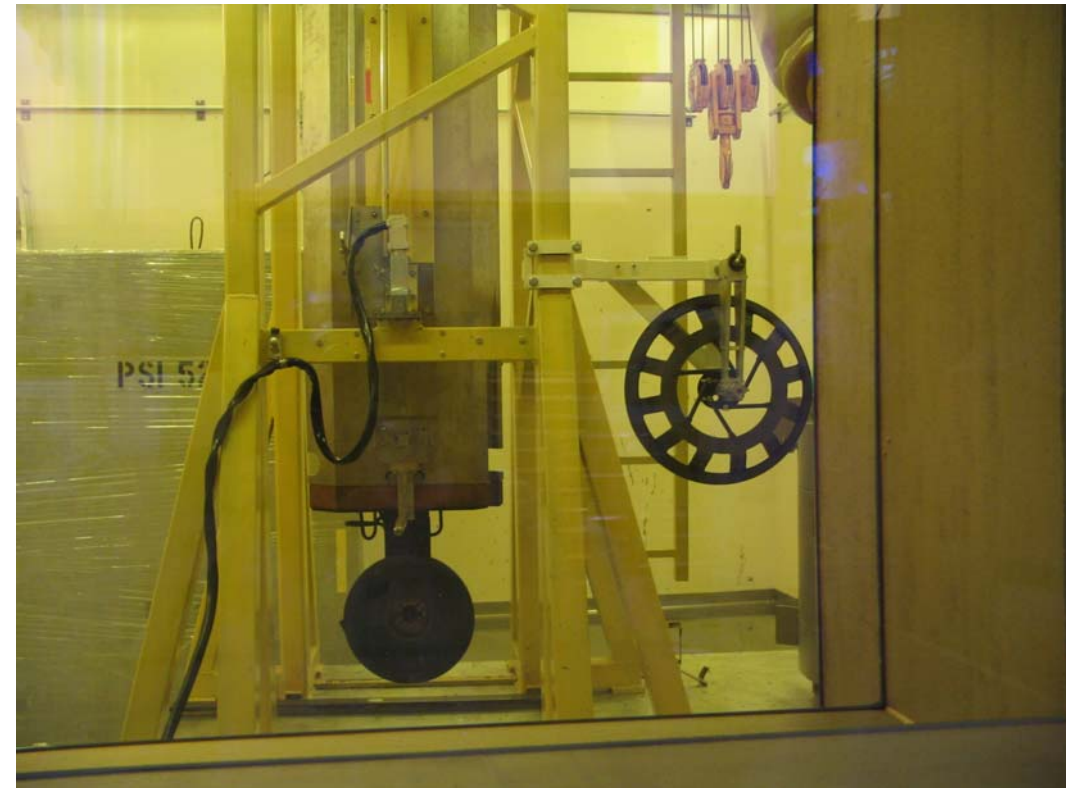


Hot Cell



Hot cell at PSI:
Manipulator max.10 kg
Power manipulator max. 2 t

Changing of the
target wheel at PSI



Ongoing Activities for Items in this EoI

Basic research:

- Testing and simulation with intense pressure waves
Test run in Plasma Physics Cave, Explore Limits for dynamic stress and benchmark simulation codes.
- Investigation of strong radiation damage in graphite
Test program together with GSI Material Research.

Design work:

- Construction work for prototype testing in FRS
- Design of plug system
- Test of inflatable vacuum seals

**Setup for
test in FRS**



Resources and Time Line

- Tests with pulsed beams at GSI (beam time)
- Material research at GSI (beam time and manpower)
- Heating tests together with GSI target lab (equipment + manpower)
- Mechanical design capacity of GSI (manpower)
- Development of tools and tests of prototypes by engineers of GSI NuSTAR groups (equipment + manpower)
- Coordination by nuclear scientists of GSI NuSTAR groups.

2009 Test of target wheel

2010 Detailed plan for handling concept

**2011 Full design of equipment, TDR,
approval by safety authorities**

2012 Manufacturing of parts

2013 Installation in Super-FRS

***provided German FAIR project money is available
and manpower is allocated at GSI***

Eol on Beam Catcher VECC Kolkata, India

Cost Book Item 2.4.11.1

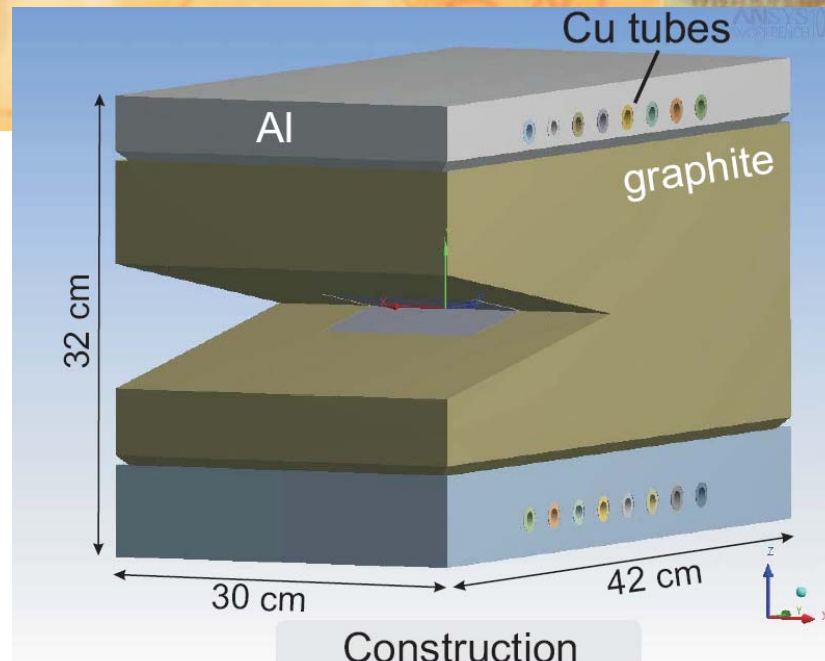
Part of Catcher hit directly by beam requires R&D and is very critical for the Super-FRS.

But in construction it is only a smaller part (listed as 265 k€).

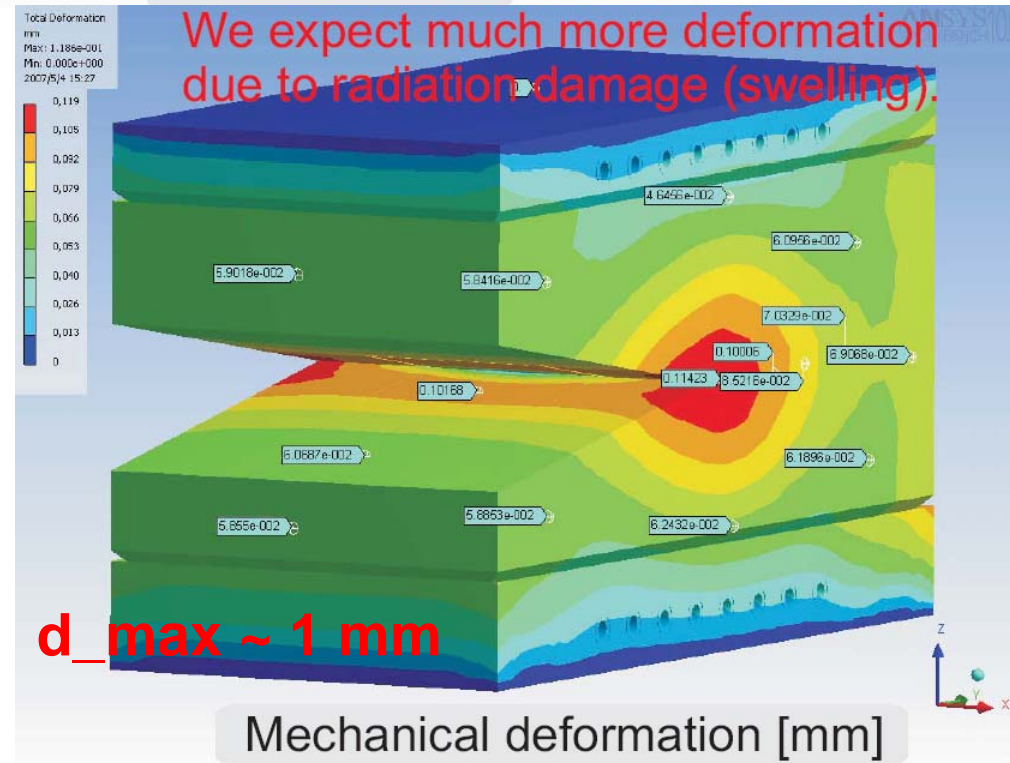
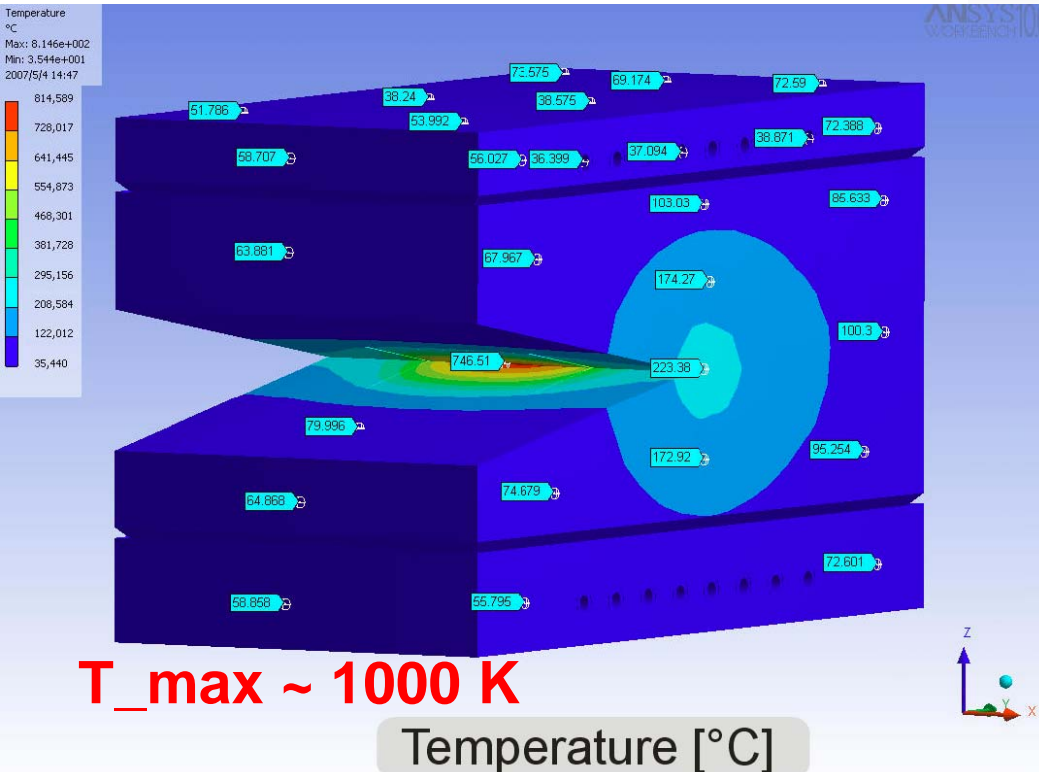
The whole system with plugs and vacuum chamber is a much larger package (listed as 787 k€).

Beam Catcher Simulation in ANSYS

Heating by 23kW of beam, up to 550 J/g in one pulse.



Construction



Beam Catcher Plugs and Chambers (needed 3 times in the Super-FRS)

