

Collimation Upgrade Specification Meeting - ColUSM

June 6th, 2014

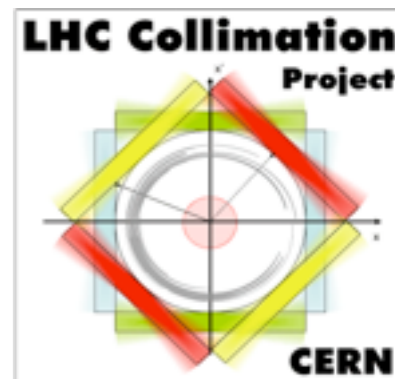
CERN, Geneva, CH

Report from meeting: US-LARP, FNAL visit and EuCARD²

Stefano Redaelli, CERN, BE-ABP



The HiLumi LHC Design Study is included in the High Luminosity LHC project and is partly funded by the European Commission within the Framework Programme 7 Capacities Specific Programme, Grant Agreement 284404.





Scope of this meeting





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- **Last month: “busy period” for meetings important for collimation:**

US-LARP collaboration meeting, CM22, joint with HiLumi (May 7th-9th)

Participants: A. Bertarelli, R. Bruce, S. Redaelli

Link: <http://bnl.gov/larp2014/>

Technical visit to FNAL on hollow e-lens hardware (May 5th-6th)

Participants: A. Bertarelli, D. Perini, S. Redaelli

RESMM14 Radiation Effects in SC Magnets and Materials (May 12th-15th)

Participant: E. Quaranta (and A. Lechner)

Link: <https://indico.fnal.gov/conferenceDisplay.py?confId=7702>

High Power Targetry Workshop (May 20th-23th)

Participants: F. Carra (plus other EN-STI members)

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1st EuCARD² Annual Meeting (May 19th-23th)

Participants: S. Redaelli, A. Rossi (and several WP11 members)

Link: <http://indico.cern.ch/event/302074/overview>

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- **Today we would like to discuss:**

Main outcomes. What we have learnt.

Immediate action arising.

How can we profit from our very active worldwide collaborations?

LARP/HiLumi Collaboration Meeting

May 7-9, 2014 • Brookhaven National Laboratory

High Luminosity LHC LARP

Homepage Registration Agenda Contact Us Meeting Information Side Meetings (May 5-6)

LARP/HiLumi Collaboration Meeting

Motivation

This is the 3rd Joint HiLumi LHC-LARP Annual Meeting and the 22nd LARP Meeting. The meeting will be focused on the parts of the HL-LHC Project that are related with the LARP efforts: IR Quadrupoles and Crab Cavities. Additionally, the LARP effort such as the Wide Band Feedback System, electron lenses, and other systems - or synergetic with LARP - such as the 11 T program will be discussed as well.



1st EuCARD-2 Annual Meeting

19-23 May 2014
DESY
Europe/Zurich timezone

Search

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- Participant List
- Committees
- Accommodation
- Social Events
- Transport
- Facility visit
- Annual Meeting Poster

EuCARD-2 is organizing its 1st Annual Meeting on 19 – 22 May 2014, hosted by DESY Laboratory in Hamburg, Germany.

The meeting will review the status of accelerator R&D in Europe, and will report the progress and activity of the EuCARD-2 work packages in fields as varied as high field magnets, advanced collimation materials, innovative radio-frequency technologies, novel accelerator concepts, accelerator applications, energy efficient accelerators, new accelerator designs, and paths to improving performance for existing accelerators. Plenary sessions will take place on 19th and 20th May, and the Governing Board will meet on May 19th. A series of parallel work package meetings will follow on 21st and 22nd May. The meeting is open to EuCARD-2 members and to external and local participants within the limit of the meeting capacity.

EuCARD-2 is co-funded by the partners and the European Commission under Capacities 7th Framework Programme, Grant Agreement 312453.

EuCARD-2 1st Annual Meeting
19-22 May 2014, DESY Laboratory, Hamburg, Germany

09:00 - 11:00	<p>WP2/WP4-CC Convener: Alessandro Ratti (LBNL), Rama Calaga (BNL), Gianluigi Arduini (CERN) Location: BNL, Berkner Hall (Berkner C)</p> <p>09:00 Beam-beam effects and limitations in HL-LHC 30' Speakers: Dr. Alexander Valishev (FNAL), Dr. Tatiana Pieloni (CERN) Material: Slides </p> <p>09:30 BBLR compensation for HL-LHC 25' Speaker: Dr. Alexander Valishev (FNAL) Material: Slides </p> <p>09:55 Strong-strong simulations: benchmark with LHC observations 25' Speaker: Dr. Ji Qiang (LBNL) Material: Slides </p> <p>10:20 Crab Cavity amplitude jitter effects on LHC beam 20' Speaker: Mastoridis Themis (California Polytechnic State University, San Luis Obispo) Material: Slides </p> <p>10:40 Coffee break 20'</p>
09:00 - 11:00	<p>Collim. (WP5) Convener: Stefano Redaelli (CERN), Tom Markiewicz (SLAC) Location: BNL, Berkner Hall (Berkner A)</p> <p>09:00 LHC Collimation System Status & Plans 30' Speaker: Stefano Redaelli (CERN) Material: Slides </p> <p>09:30 Irradiation tests of collimator materials 30' Speaker: Dr. Nikolaos simos (BNL) Material: Slides </p> <p>10:00 Report of CERN tests on SLAC-Rotating Collimator 30' Speaker: Alessandro Bertarelli (CERN) Material: Slides </p> <p>10:30 Coffee 30'</p>
11:00 - 12:30	<p>WP2/WP5 Convener: Tom Markiewicz (SLAC) Location: BNL, Berkner Hall (Berkner A)</p> <p>11:00 Electron lenses: hollow beam scraper design report and preliminary studies on long-range compensators 30' Speaker: Dr. Giulio Stancari (Fermilab) Material: Slides </p> <p>11:30 Update on halo monitoring techniques 30' Speaker: Alan Fisher (SLAC) Material: Slides </p> <p>12:00 Status and plan for alternative halo control methods 30' Speaker: Roderik Bruce (CERN) Material: Slides </p>

US-LARP effort now focused on

- Magnets
- Crab cavities
- SPS feedback

Clearly seen in the program and in the selection of Toohig fellows..

Important collimation activities still ongoing:

- Hollow e-lenses
- Irradiation tests
- SLAC RC completion

Important progress was reported.

Joint sessions with WP2: synergy for halo monitoring and e-beams for BB compensation.

Satellite meetings:

- CC review
- Magnet review



CM22: collimation highlights





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● Hollow e-lenses:

- *Conceptual specs now completed. Also subject of a IPAC2014 talk.*
- *Significant improvements on simulations:
simplectic maps computed from field measurements at the test stand.
Already used by Sasha and now ready for implementation in SixTrack.*
- *Main design change: proposed '**S**' instead than '**U**' shape to compensate kick from asymmetric electron beam in 'U' shape configuration.*
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- *Irradiation tests with 200 MeV p completed by now.*
- *Additional new tests: ion irradiation with Tandem accelerator, synchrotron light diffraction measurements of old and new samples.*

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● SLAC RC

- *Report from CERN side was well received*
- *Comprehensive summary of CERN validation tests, including impedance*
- *Only miss vacuum results.*
- *See reports at this meeting and IPAC2014 paper under preparation.*

BNL Facilities Associated with the Study

BLIP (200 MeV proton and spallation neutron irradiation)

Isotope Extraction Facility Hot Lab laboratory for macroscopic post-irradiation analysis (including spectral analysis)

CFN for Electron Microscopy, Annealing, DSC/TGA

NSLS for X-ray Diffraction on irradiated and irradiated samples

Tandem van de Graaff for 28 MeV proton irradiation for very localized proton-induced damage

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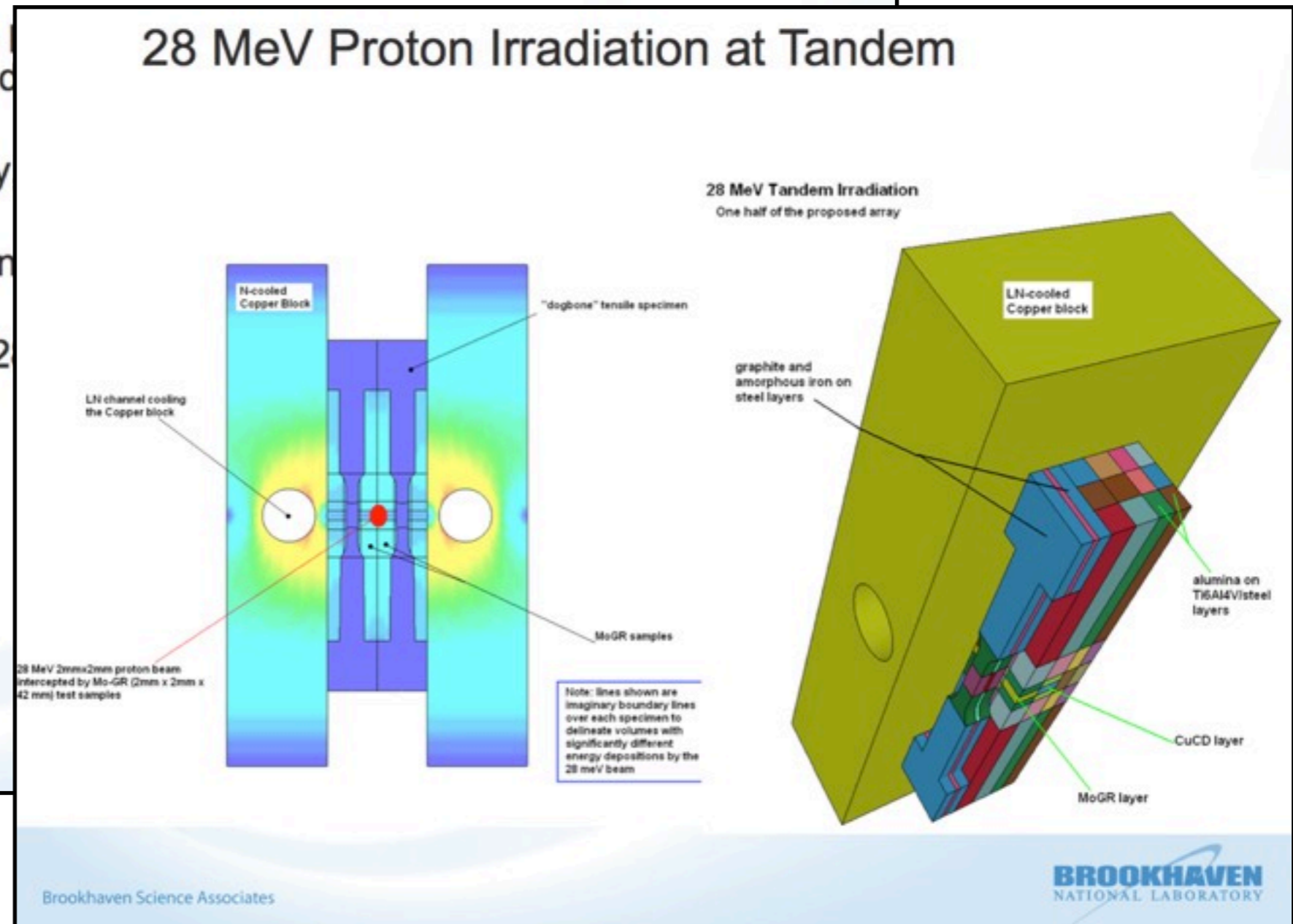
Isotope Extraction Facility for irradiation analysis (including)

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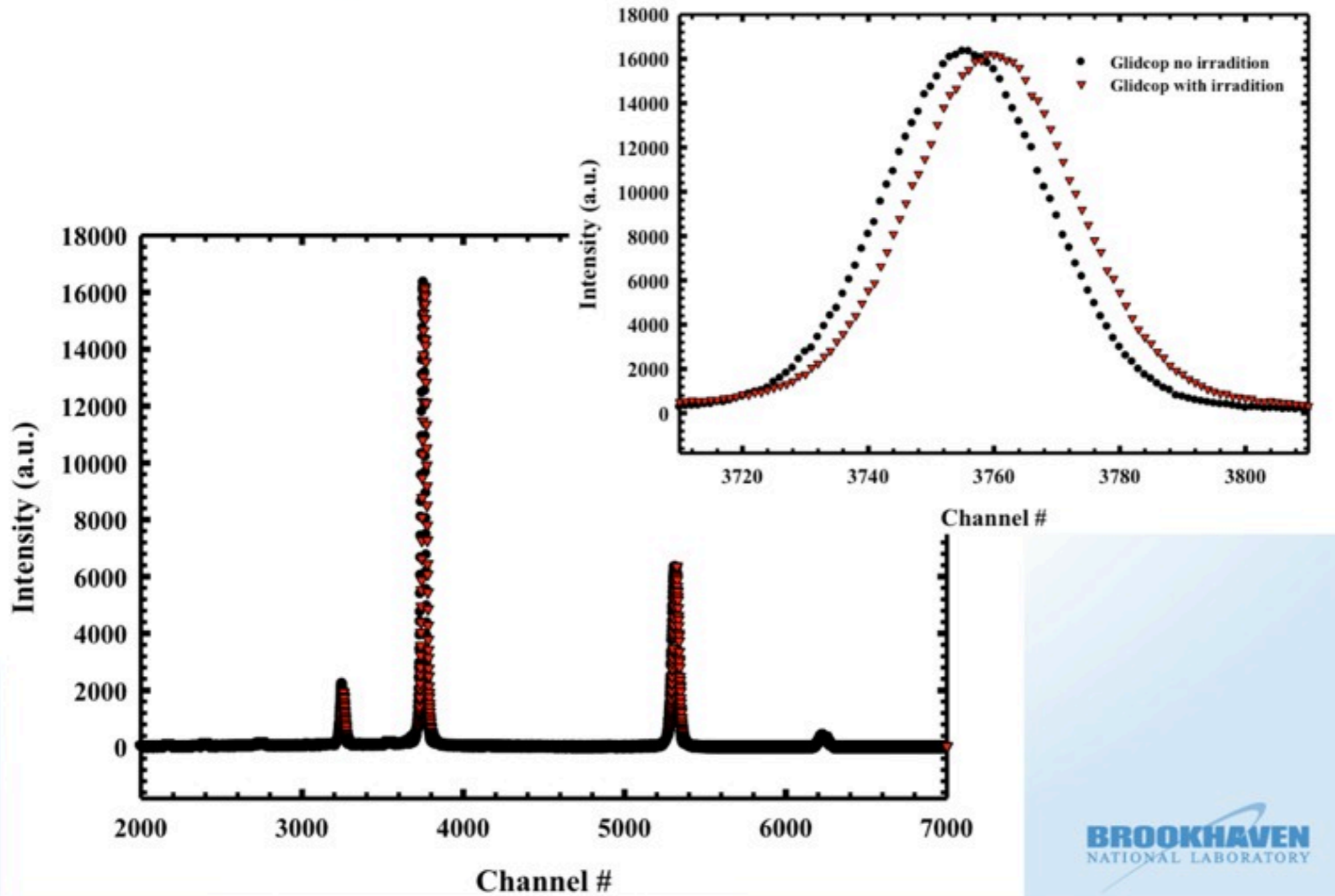
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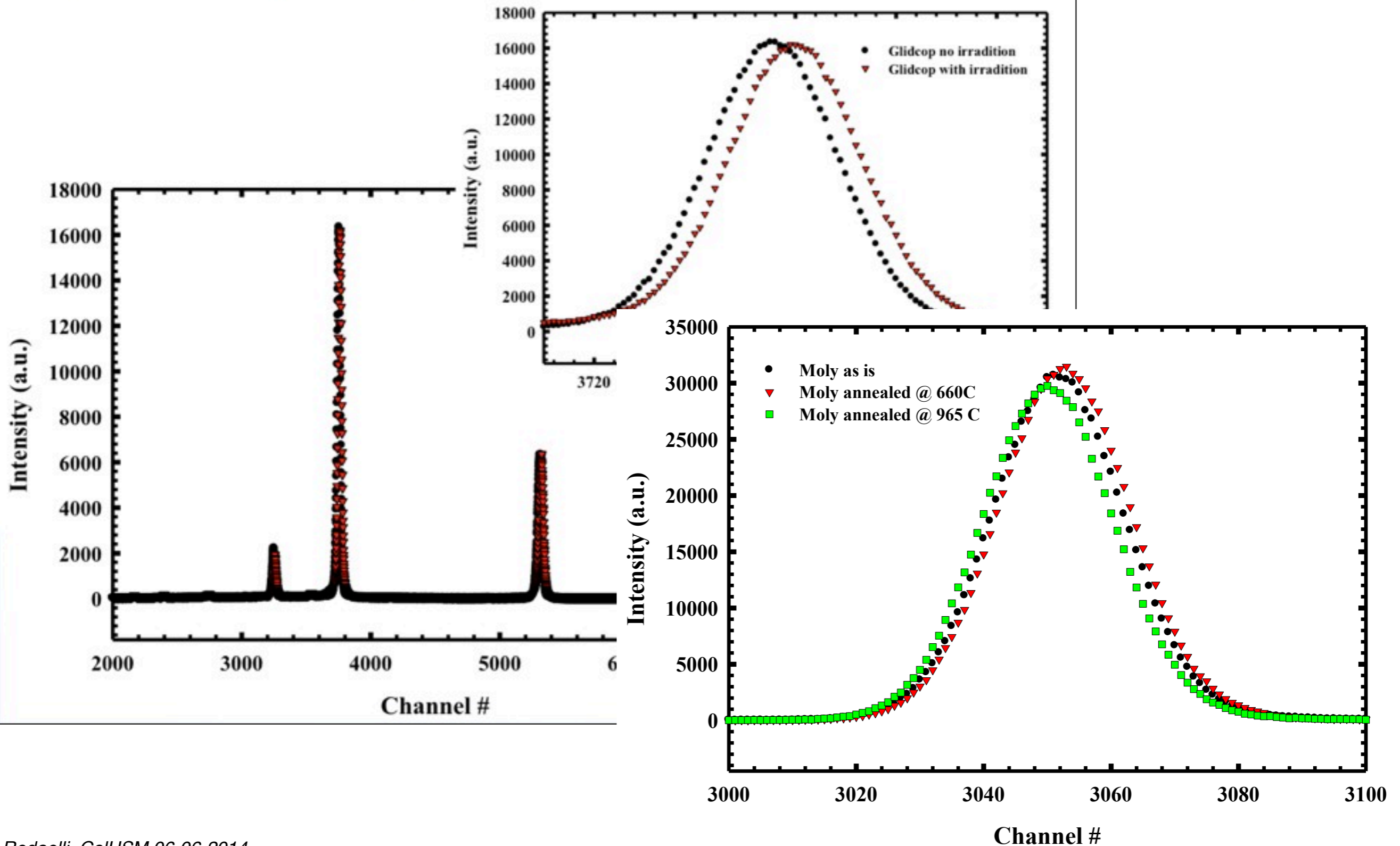
28 MeV Proton Irradiation at Tandem



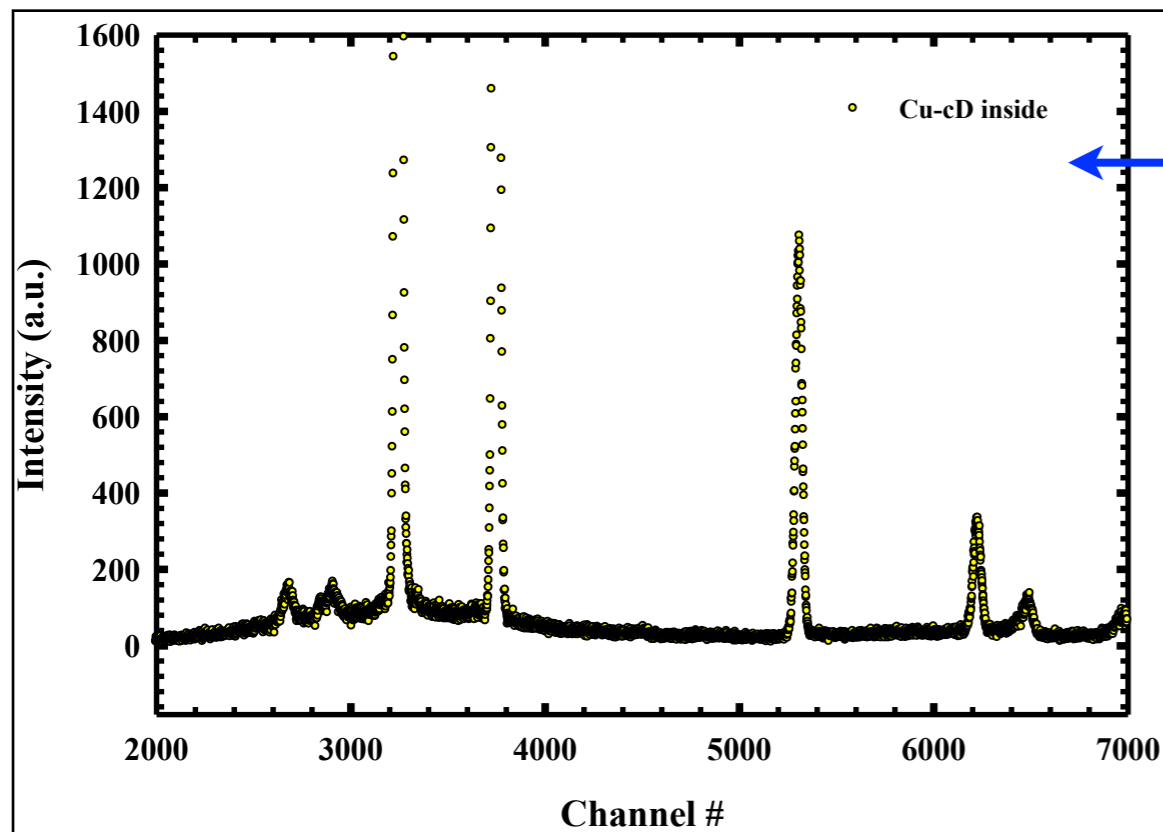
Glidcop Preliminary Results (materials of first phase study)



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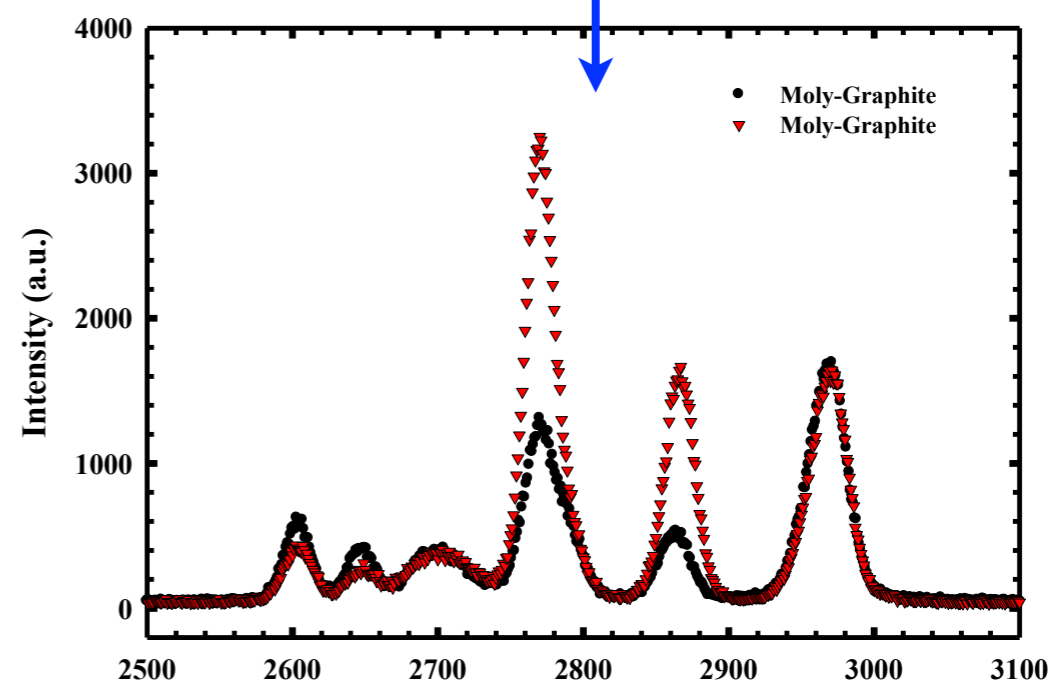
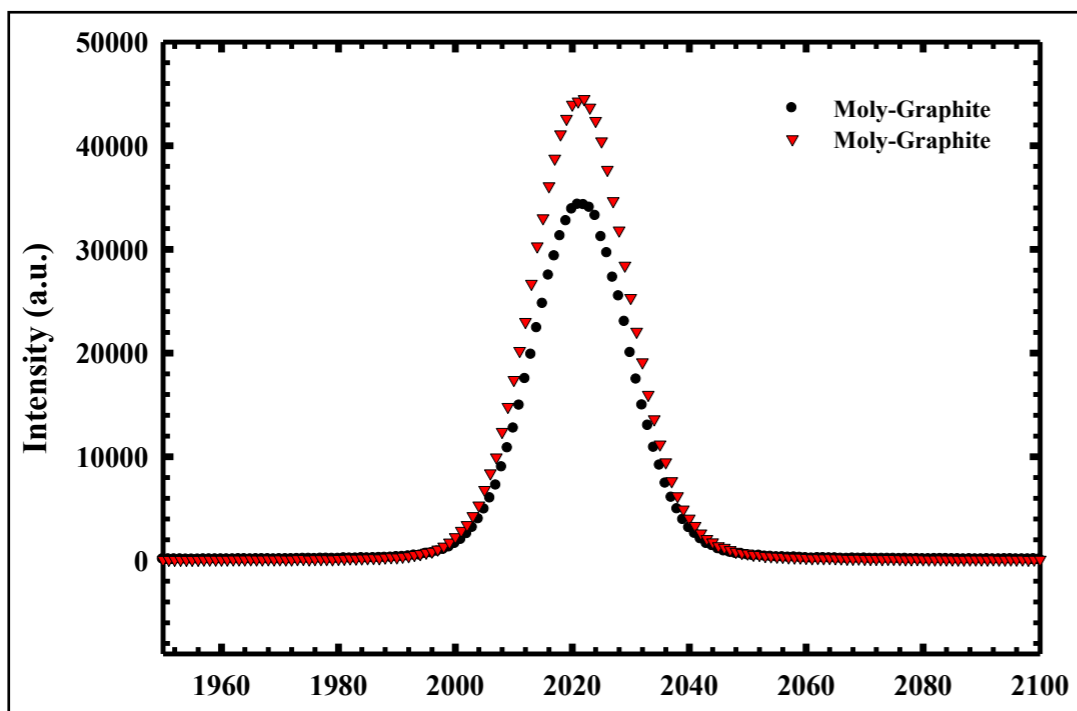


Material irradiation (iii)



Cu-cD

MoGR





Technical visit to FNAL





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- **Also discussed with N. Mokhov:**
 - *Strong interest in participation to the BNL data analysis*
 - *Will work on radiation studies for the e-lenses as LRBB compensator!*



EuCARD² Annual Meeting





EuCARD² Annual Meeting



- **Two plenary contributions:**

- *A. Rossi: General WP11 presentation*

- *J. Stadlmann: Results of GSI irradiation tests on behalf of M. Tomut.*

both well received. Important experimental results. Only WP11 brought industry at the Annual Meeting (BrevettiBizz + RHP).



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- *Some strong statements by Jens on material behaviour under ion irradiation (Cu-cD vs MoGR) need to be followed up and understood!*
- *We must now focus on the modelling part (DPA's, comparison simulations/measurements). Collect consistently experimental data.*
- *Simulation plans for cleaning not really discussed (decided to have a joint workshop at Daresbury HiLumi-EuCARD2)*
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- **No dedicated WP11 session, but useful coffee meeting with the key players**

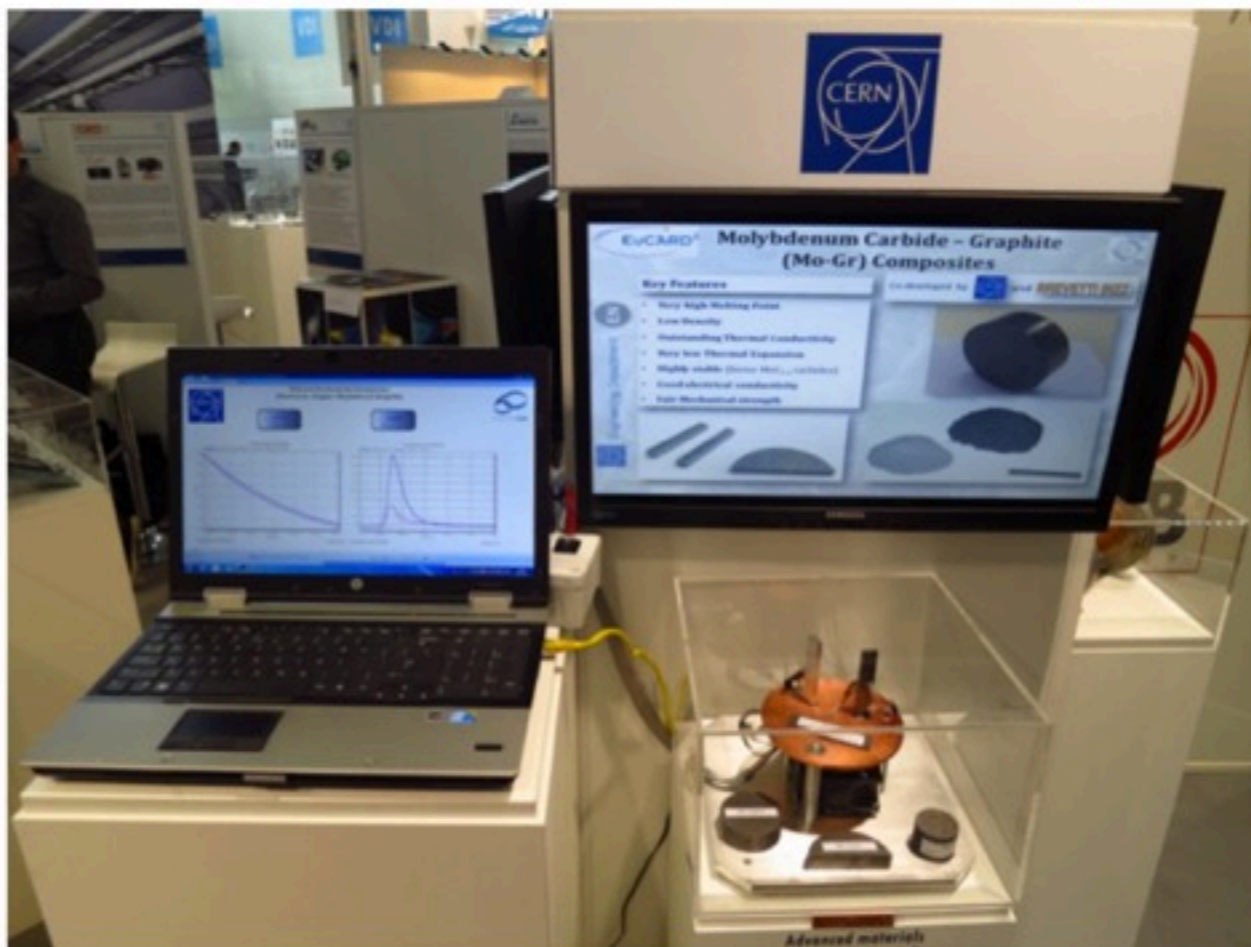
- *Trying to setup a studentship program with Malta*
- *Decided on a new WP11 meeting before the end of the year*
- *Must follow up come comments about RHP about the missing information on some samples from their side: "action" AB + AR*
- *We should document on our page under the ColUSM the detailed status of samples, ideally covering also EuCARD-1 (Action Elena?)*



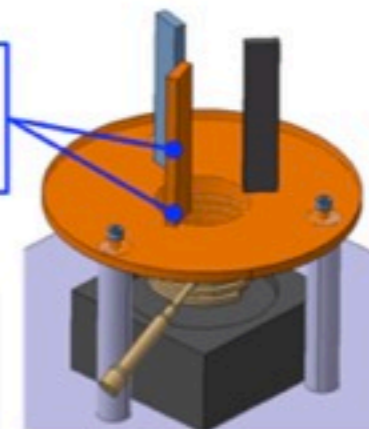
Hannover Messe 2014

April 7-11, 2014

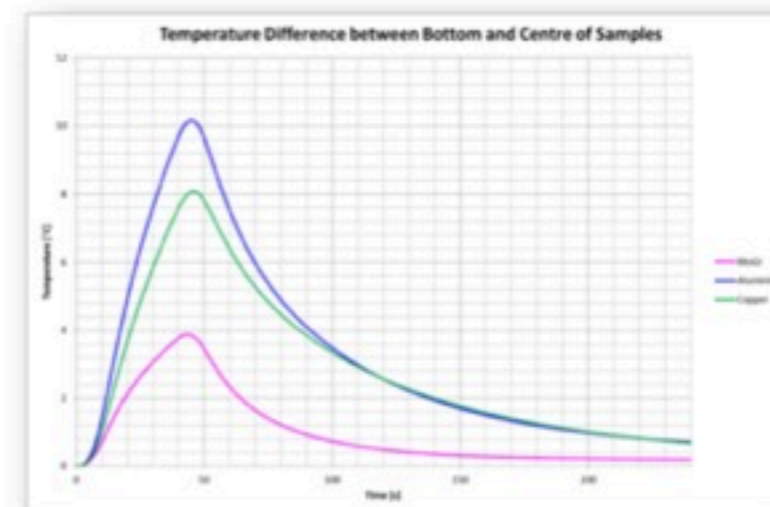
EuCARD-2 WP11 Advanced Materials (Mo-Gr) - dedicated thermal conductivity demonstration set-up:



Measuring points
(Sample Centre and Bottom)



- Mo-Gr 770 W/mK
- Copper 385 W/mK
- Aluminum 240 W/mK



“Official” movie with interviews available for download from:

https://www.dropbox.com/s/hcqwluiaia827wx/CERN-ESA-Hannover-Messe-2014_Final_Version.mp4?n=247162037



ALESSANDRO BERTARELLI

HEAD OF CERN MECHANICAL DESIGN OFFICE SECTION
MATERIALS AND MECHANICAL ENGINEERING GROUP, EN DEPARTMENT (EN/MME/EDS)

Very important outreach aspects of these studies. We have to continue like that!