

Minutes of 50th Collimation Upgrade Specification Meeting

Participants: A. Bertarelli (AB), F. Carra (FC), M. Fiascaris (MF) (scientific secretary), P. Gradassi (PG), J. Guardia (JG), P. Hermes (PH), A. Lechner (AL), P. Nocera (PN), E. Quaranta (EQ), S. Redaelli (SR) (chairman), A. Rossi (AR), R. Rossi (RR), G. Valentino (GV)

Remote: S. Bizzaro (SB), N. Sammut (NS), M. Tomut (MT).

Indico event [here](#).

1 Pending Actions

Actions from this meeting:

- Make parameters used for DPA calculations (possibly coming from measurements) available to other collaborators (MT).
- Meet with MT in early March to discuss results on DPA (MT, AR, SR, AB).
- Organize meeting to discuss status of simulations (AR).

2 Summary and highlights of EuCARD2 ColMat HDED WP annual meeting (A. Rossi) [\[slides\]](#)

2.1 Summary of the presentation

The scope of this meeting was to follow up on the EuCARD2 ColMat HDED WP annual meeting held last December at GSI ([link](#)), giving an overview of the topics discussed for those who did not attend, but also taking concrete decisions. AR summarized the main results and future work planned. She also highlighted the remaining opened issues. In the following only the main points raised are summarized.

On the topic of irradiation tests and characterization of materials for collimators, it remains to be assessed (see work by NS) what is the impact of different grades of MoGr given that the irradiated samples were more than two years old. A significant part of the meeting was dedicated to DPA (displacement per atom) due to irradiation, with long discussions on electronic stopping. An open question remains on the damage threshold for graphitic material under proton irradiation. It should be understood if this threshold remains valid for energetic protons where H/He transmutation is relevant. A formula for a figure of merit for estimating damage was also proposed at the meeting and AR asked for feedback on it. In addition a proposal was made for a measurement of He transmutation and it was highlighted that DPA calculations and measurements should be compared using, for example, GSI data.

2.2 Discussion

On the work by OS, it was asked whether the samples from RHP have arrived. It was answered that some have arrived while the remaining ones should arrive this week.

3 Review of actions and comments to the meeting, future work (Round table)

MT commented on the calculations and measurements of DPA at GSI. She confirmed that they will do DPA calculations at GSI and more precisely they will calculate the vacancy density. AR asked MT to provide the parameters used to make a sample calculation available for the other collaborators. MT added that they also plan to have a resistivity measurement, since this is a sensitive variable that scales linearly with the number of defects up to a threshold. AR asked if DPA can be measured directly. MT answered that this is not possible, because DPA is just the initial situation and an equilibrium is then reached after a few pico-seconds, after which lattice readjustment takes place. However one can relate DPA to the density of defects.

SR commented that it would be very useful to make the data available to the European work-packages. MT answered positively and pointed out that a first publication could be done soon for the SHIM conference (the deadline for abstracts being on January 21st). This would not be a review paper but rather a paper with first results. Therefore it should be decided whether we aim at including results on both materials (CuCD and MoGr) or only focus on MoGr. The consensus was that this will depend on how quickly the results can be available but that certainly for the European Report results on both materials should be presented. It was agreed that an intermediate meeting for discussing the results will be held at the beginning of March.

SR suggested to schedule a meeting to understand the status of simulations. Since there are several people working on simulations, the meeting should aim at discussing the plans of the different groups, to make sure all topics are covered and overlaps are minimized. A simple case for comparison among the groups should also be established.

AL added that they plan to study the recoil spectra to investigate what is the main contribution to DPA and how comparison to experiments can be made.