RaDIATE BNL BLIP Irradiation Run Planning VC Meeting 7
11.29.16

Present
ESS: Yongjoong Lee
FRIB: Frederique Pellemoine
CERN: Elvis Fornasiere, Claudio Torregrosa
BNL: Leonard Mausner, Nick Simos, Dmitri Medvedev
KEK: Taku Ishida
RAL: Mike Fitton
FNAL: Patrick Hurh, Sujit Bidhar, Kavin Ammigan
OXFORD: Slava Kuksenko
PNNL: Andy Casella

Notes

- Proton energy budget adjustment
  - Beryllium capsule modified in order to meet proton energy budget.
  - 1.5 mm of specimens eliminated from capsule: 1 layer of tensile specimens and 1 layer of bend specimens.
- Update from Nick
  - FLUKA analysis for both target box configurations (2 weeks and 6 weeks of running) has been completed. Energy degradation and residual dose results obtained, and will be shared with the group soon.
  - Confirmed that high-Z capsule will need about 3 months of cool-down before they can be shipped in BNL Type A CROFT container.
  - Target box configuration will provide 2.5 mm of water cooling channel between each capsule.
  - Safety document will be finalized within the next week or so, and will be sent to the BNL review committee.
  - Please forward your capsule thermal analysis results to Nick to include in the safety document.
- Capsule and specimen shipment after irradiation and cool-down
  - BNL Type A CROFT containers will not comply to new documentation rule that goes into effect on Jan. 1st, 2017.
  - Therefore, we need to look into other options
    - Renting of container (need to check on cost)
    - Buying a new container (about $50k for one)
    - Recertifying current BNL containers
- Leonard suggested that delaying the experiment by a couple of weeks should be fine. Isotope production run is between February and July, and we need to fit our 8 week

irradiation in between that time period. BLIP is expected to perhaps have 3 runs with Thorium at 200 MeV (each run for about 5 days long).
    - We could potentially remove our target box during the Thorium runs to avoid reconfiguration of our target box (vacuum degrader) for appropriate energy degradation.
- Nick has requested final assembly drawings for each capsule. Please send your drawings to Nick as soon as they are available.
- KEK Ti specimens update
    - Grade 5 and Grade 23 tensile and fatigue specimens are expected to be completed within the next week. If so, these will be given to Patrick during his visit to Japan to bring back to Fermilab.
    - Also trying to introduce Grade 6 Ti specimens in both US and DS Ti capsules. This is dependent on whether the company can deliver the specimens by the end of the year.
- Oxford/RAL meso-scale Ti fatigue foils
    - Manufacturing procedure has been established for the foils.
    - Initial polishing/lapping of 0.4 mm thick trial foil resulted in bent foil, which is likely due to residual stress in the sheet material.
        - Not expected to occur with the foils extracted from the bar which has already been stress relieved.
    - Fabrication schedule of foils not certain at the moment, but will try to have them ready by the end of December.
- FRIB Ti specimens
    - Fabrication ongoing and expecting delivery within the next week or so. Pre-irradiation material characterization will then be carried out before shipping to Fermilab, hopefully by the end of December.
- CERN capsules update
    - 2 mm deformation observed after welding thin 2.21 mm high-Z capsule.
    - Weld prep design improved to minimize capsule distortion upon welding.
    - In parallel, new capsule design has been implemented as a backup.
    - Capsule welding tests foreseen during this week.
    - Final specimens are expected to arrive by the end of December, and final capsule assembly anticipated at the end of December or early January.
    - As a backup plan for capsule welding, Nick suggested having EB industries weld the CERN thin capsule.
- Beryllium and Graphite capsules update
    - All graphite specimens have been fabricated and their dimensions/weights are currently being measured. Outer filler pieces and SS capsules are currently being fabricated.
    - Beryllium specimens are being fabricated, but with longer than expected lead time. Now, expecting specimens to arrive early January, which may potentially delay the start of the experiment. The graphite outer fillers and SS capsule are also being fabricated.
    - Fabrication of the Ti capsule outer fillers and SS capsules/windows by FNAL is ongoing.

- FNAL will coordinate with BNL and EB industries for the welding and assembly of the 4 capsules (Be, C, US Ti, DS Ti).
- Nick suggested fabricating spare capsules for each specimen capsule.
- Nick mentioned that EB industries has welded 3 mm thick capsules in the past with very low deformation.
    - Suggested inquiring with Jim at EB industries for our 2.2 mm thick capsule.