

PNNL Beam Window and Target Analyses

Tuesday, 20 May 2014 17:30 (1h 30m)

In this presentation, PNNLs work on structural analysis, material selection and fabrication issues associated with the energy deposition of proton beams in representative windows and targets will be explored. Strategies to improve the survival of beam window and target designs under challenging energy deposition rates will be discussed. High power beam parameters can induce very high thermal cycling, thermal shock and stress waves that in combination with material damage effects due to the irradiation may eventually exceed the available strength and ductility of the material. The energy deposition and resulting thermal response and induced stresses and strains are computed using the ANSYS finite element code. PNNLs extensive experience in the design of test trains successfully irradiated in the Advanced Test Reactor will be reviewed with a focus on available irradiated material properties, cooling methods, and novel fabrication strategies. The presentation will address optimal combinations of material properties, window and target configurations and beam parameters that should allow for greater utility of the components under the extreme demands of high energy proton beam applications.

Summary

Summary oral presentation (~15-20 min) on PNNLs analyses with a focus on stress/strain results, material selection, rapid thermal cycling, irradiated material properties, cooling and fabrication related issues.

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Track Classification: Target Design Challenges