Contribution ID: **1187** Contribution code: **THPM017** Type: **Poster Presentation**

Design development and technological R&D for niobium-cladded beam production targets

Thursday, 11 May 2023 16:30 (2 hours)

High power particle producing target components in research facilities often consist of refractory metals. They experience challenging thermo-mechanical conditions and therefore require dedicated cooling systems. Employing water-cooling in direct contact with the target materials, especially tungsten (W), induces erosion and corrosion. Cladding the target blocks with erosion/corrosion-compliant materials is also a solution for a reliable heat transfer from the core materials to the coolant. Tantalum (Ta) is used in various facilities as cladding due to its corrosion resistance, outstanding thermo-mechanical properties, and diffusion bonding compatibility.
The Beam Dump Facility (BDF) - a new proposed fixed target experiment at CERN –explored at first Ta2.5W cladding for molybdenum-based alloy TZM and pure W blocks. However, Ta presents non-negligible decay heat and high price. In this study, niobium-based materials –pure Nb, Nb1Zr, and Nb10Hf1Ti (C-103 alloy) – are evaluated as an alternative for cladding. The niobium alloys are assessed by their diffusion bonding via Hot Isostatic Pressing (HIP) and by thermo-mechanical characterization of the interfaces. Simulations of the impact with a high-power proton beam complement the study.

Funding Agency

Footnotes

I have read and accept the Privacy Policy Statement

Yes

Primary author: GRIESEMER, Tina (European Organization for Nuclear Research)

Co-authors: GALLIFA TERRICABRAS, Adrià (European Organization for Nuclear Research); PEREZ FONTENLA, Ana Teresa (European Organization for Nuclear Research); MAZZOLA, Giuseppe (European Organization for Nuclear Research); ARNAU-IZQUIERDO, Gonzalo (European Organization for Nuclear Research); AVILES SANTILLANA, Ignacio (European Organization for Nuclear Research); ESPOSITO, Luigi Salvatore (European Organization for Nuclear Research); CALVIANI, Marco (European Organization for Nuclear Research); CUSWORTH, Matthew (Nuclear Advanced Manufacturing Research Centre); MENA ANDRADE, Ramiro (European Organization for Nuclear Research); FRANQUEIRA XIMENES, Rui (European Organization for Nuclear Research); DUTILLEUL, Thomas (Nuclear Advanced Manufacturing Research Centre); KYFFIN, William (Nuclear Advanced Manufacturing Research Centre)

Presenter: GRIESEMER, Tina (European Organization for Nuclear Research)

Session Classification: Thursday Poster Session

Track Classification: MC7: Accelerator Technology and Sustainability: MC7.T35: Advanced Manufacturing Technologies for Accelerator Components