Contribution ID: **28** Type: **Talk**

Develop a small solid lithium ceramic breeder with in-line tritium detection capability for calibrated neutron sources

Thursday 5 February 2026 16:40 (30 minutes)

The supply of tritium fuel within a tokamak design fusion reactor remains an ongoing challenge for the developing nuclear fusion industry. Tokamak-design fusion reactors will need to be self-sufficient for the supply of tritium fuel into their fusion reaction. To satisfy this self-sufficiency criteria, numerous breeder blanket concepts for tritium generation exist, with liquid lithium and solid lithium sources arguably the most popular. Whilst lithium has a modest melting temperature, advantages of a solid lithium breeder blanket design over a liquid one include (i) avoidance of complex magnetohydrodynamic effects that electrically conductive liquids bring, (ii) good thermal stability, and (iii) preferable tritium release characteristics. As such, this work studies the breeding of tritium from solid lithium sources. Further, research into the structural materials for the exterior of a breeder module, which can withstand tritium containment, is of equally critical importance. This presentation will report the recent progress of a project in developing the tritium breeding and detection capability at the University of Birmingham. The development includes the manufacturing of a Eurofer-97 made breeder module which contains sintered lithium ceramics (Li2TiO3) which will be exposed to a neutron beam. The produced tritium will then be collected using a bubbler-liquid scintillator counter system assisted with purging helium gas. The project is part of a campaign to ultimately develop a comprehensive tritium breeding, storage and characterisation capabilities.

Speaker affiliation

University of Birmingham

Authors: Ms APPLEBY; ARMITAGE; ATTALLAH; BUTT; COCKRELL; DAVEY; JIMENEZ-MELERO; LIMPENNY; MIDDLEBURGH; PHOENIX; TURNER, Richard (University of Birmingham); WHELDON; CHIU, Yu-Lung (University of Birmingham); ZANCAN; ZANG

Presenter: TURNER, Richard (University of Birmingham)

Session Classification: Session 3-12

Track Classification: LIBRTI Conference