Contribution ID: **376** Type: **Invited Oral**

C3Or2B-01: [Invited] Assessment of Helium Management during Commissioning and Operations of MPEX Magnet System

Wednesday 12 July 2023 11:00 (30 minutes)

The superconducting (SC) magnet subsystems for the Material Plasma Exposure eXperiment (MPEX) provide steady state axial fields between 0.05 T and 2.5 T in order to confine the plasma generation and enable the necessary radio freqency source and heating to achieve fusion prototypic environments at different material targets. To maximize the thermal stability of the superconducting magnets and reduce the technical risk given the relative size and number of the superconducting magnets, liquid helium recondensing refrigeration systems were selected at the beginning of the design process to provide the necessary cooling load. As the design has progressed, there has been a significant disruption in global helium supply chains due to pandemic and socio-economic conditions. These conditions warranted a more rigorous assessment of the specific helium usage during acceptance testing, installation, commissioning, and operation to determine best methods to offset the cost and schedule impact to the MPEX project. A comparison was carried out, with respect to the cost of a modest helium recovery system and the planned usage for the SC magnet subsystem, to determine the cost of helium per liter and cost of electricity, where conservation and recovery would be feasible.

Authors: Mr AARON, Adam (Oak Ridge National Laboratory); Mr HUSSAIN, Aftab (Oak Ridge National Laboratory); Dr BURKHARDT, Earle (Oak Ridge National Laboratory); Dr RAPP, Juergen (Oak Ridge National Laboratory); LEVANTINE, Oliver (Tesla Engineering Ltd); Dr FERGUSON, Philip; DUCKWORTH, Robert; WARNER, Rory (Tesla Engineering Ltd); KEYS, Simon (Tesla Engineering Ltd); HAWKINS, Stuart (Tesla Engineering Ltd)

Presenter: DUCKWORTH, Robert

Session Classification: C3Or2B: Superconducting V: Accelerator Magnet Systems