

## Flux trap targets: New look using Molybdenum

S. Ansell

Rutherford Appleton Labs, STFC, Chilton, Didcot, Oxfordshire, OX11 0QX, U.K.

stuart.ansell@stfc.ac.uk

### Abstract

Spallation sources using ux trap targets have the possibility to produce significantly higher fluxes and significantly sharper peaks. They have been used at full production facilities like the Lujan centre, and shown to give up to 50% more ux. There are several disadvantages with them that make using them in the lower powered systems, small target systems like ISIS-TS2 because of the extra complexity in the cooling circuits. In order to maintain an edge cooled target, water flows would need to go over the back and front face of a traditional ux trap, which negates the gain from the ux trap design.

It has turned out that molybdenum has two useful properties (a) it has the same thermal expansion rates as tungsten and (b) it can be welded or hot-isostatic pressed (HiP) with the tungsten. Since solid tungsten targets can be made by a HiP process of W powder, this can be combined with Molybdenum to make a composite target of both molybdenum and tungsten with any internal structure desired, but give a clean cylindrical outside surface that then easily act as a water cooling channel.

Since the idea is viable as a replacement TS2 target, we show the neutronic gains that are possible by modifying the existing solid tungsten target to be an effective ux trap target. However, we are not limited to a single ux trap space and use a number of directed cones in the to increase the potential flux by 40%.