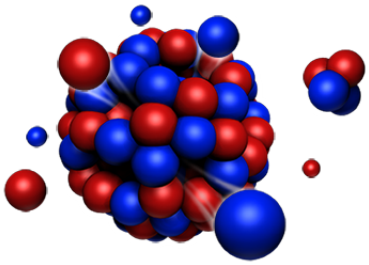

Contribution ID: **40** Type: **Poster**

Moderator development at ISIS

Wednesday 16 October 2019 13:00 (2 hours)

Moderators are an essential part of neutron scattering facilities and there is an on going search for new moderator materials, new moderator designs and longer lived efficient moderators suitable for high power spallation facilities. ISIS has several moderators including light water, liquid Hydrogen, liquid Methane and solid Methane. Moderator development at ISIS is a mix of long term research into new moderator materials or designs and improvements to the current suite of moderators.
A recent focus of moderator development at ISIS has been the ortho-para concentration in the hydrogen moderators [1] and gaining a deeper understanding of the catalyst [2] by using the ISIS suite of neutron instruments.
Another strand to the moderator research has been the development of our capability to measurement cross sections and vibrational density of states at ISIS in order to produce scattering kernels for potential new moderator materials such as TPM [3]. This work has been done in collaboration with other institutes such as CNEA Bariloche.
Another recent aspect has been the testing of the ISIS Target Station 1 Methane moderator at 100k rather than 110k to compare with scattering kernels at different temperatures on both a new and old methane moderator. The aim here is to provide data for the Target Station 1 Project to evaluate the performance of a new Methane moderator once it is installed in 2021.
The improvements to current moderators include both neutronics improvements such as optimising the ISIS Target Station 2 Hydrogen moderator and engineering improvements such as the use of improved welding techniques for the encapsulation of the Gd poison foils.
Future plans include further moderator material testing, developing a PIE program for moderators and developing a robust monitoring system to examine the health of the moderators in service.
This paper gives a broad overview of the ISIS moderator development activities in the last few years and a brief outline of future plans.

References:
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2. G Romanelli, et al, J.Phys. Chem. C, 2019, 123, 18, 11745-11751 https://doi.org/10.1021/acs.jpcc.9b01858
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Authors: Mr LILLEY, Steven (ISIS); Dr SKORO, Goran (ISIS); Dr BEWLEY, Robert (ISIS); Mr JENKINS, David (ISIS); Dr ROMANELLI, Giovanni (ISIS); LANGRIDGE, Sean (ISIS); POOLEY, Daniel (ISIS)

Presenter: Mr LILLEY, Steven (ISIS)

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