ECNS 2023
Garching

EUROPEAN
CONFERENCE
ON NEUTRON
SCATTERING

Contribution ID: **22**   Type: **Poster**

The TOSCA secondary spectrometer upgrade: design and simulations

Tuesday, 21 March 2023 16:00 (2 hours)

TOSCA is a high-resolution, broad band, indirect geometry chemical spectrometer operated at the ISIS Neutron and Muon Source, UK. As a neutron analogue to optical spectroscopy, it is optimised for the study of molecular vibrations in fields such as catalysis, hydrogen storage materials, hydrogen bonded systems, or biological and organic compounds. We present the detailed design and performance of the proposed upgrade of the TOSCA secondary spectrometer. The entire secondary spectrometer will be replaced and new sets of large, curved pyrolytic graphite analysers, beryllium filters and position sensitive detectors will be installed. The design, dimensions and placement of each component has been optimised with neutron ray-tracing simulations. A gain factor in detected intensity of a least 10 is expected over the current instrument, independent of the neutron energy. This results from the increased solid angle coverage, increased transmission through the filter, and increased neutron detection efficiency. The predicted spectral resolution remains close to 1% of the energy transfer at high energy transfer. Furthermore, the performance of the beryllium filter in eliminating high energy neutrons has been improved by a factor 10, which should improve the signal-to-noise ratio and thus the sensitivity and detection limit of the instrument. This upgrade will ensure that TOSCA remains highly competitive in years to come.

Primary author: PERRICHON, Adrien (UKRI, STFC, ISIS Neutron and Muon Source)

Co-authors: Mr BOVO, Claudio (UKRI, STFC, ISIS Neutron and Muon Source); Mr RASPINO, Davide (UKRI, STFC, ISIS Neutron and Muon Source); Dr ARMSTRONG, Jeff (UKRI, STFC, ISIS Neutron and Muon Source); Prof. PARKER, Stewart F. (UKRI, STFC, ISIS Neutron and Muon Source); Dr GARCÍA SAKAI, Victoria (UKRI, STFC, ISIS Neutron and Muon Source)

Presenter: PERRICHON, Adrien (UKRI, STFC, ISIS Neutron and Muon Source)

Session Classification: Poster session TUESDAY

Track Classification: Neutron Instrumentation, Optics, Sample Environment, Detectors, and Software