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Author: Nicolò Marconato (Università di Padova-Centro Ricerche Fusione, Italy)

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Another way to submit your slides: from the **Timetable**

Timetable

Mon 04/07 Tue 05/07 Wed 06/07 All days

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Session legend

Guided Tour of Palazzo Bo – Keynotes Opening session Oral session 1 see more...

08:00			
15:00	Re-designing neutron spectrum unfolding for fusion applications Auditorium, Orto Botanico	Click	15:00 - 15:08 Ocean Wong
	Plasma speed optimization for improved tokamak plasma confinement Auditorium, Orto Botanico		15:08 - 15:16 Mrs Anna Krupka
	Additive manufacturing of high heat flux metallic components in EU-DEMO reactor Auditorium, Orto Botanico		15:16 - 15:24 Francisco Canillas
	Exploratory analysis with MELCOR-fusion for the IFMIF-DONES Safety design		Manuel Pérez García

Re-designing neutron spectrum unfolding for fusion applications

Activation foil neutron spectrum unfolding was first devised over 50 years ago as a technique for measuring the neutron spectrum in research reactors due to its sensitivity to high energy neutrons. Coincidentally, it will be the primary neutron

🕒 15:00 - 15:08
📍 Auditorium (Orto Botanico)

Presenter Ocean Wong

Ocean Wong
15:00 - 15:08

A red arrow points to a menu icon (three horizontal lines) which is circled in red. A red box labeled "Click" is positioned to the right of the menu icon.

Re-designing neutron spectrum unfolding for fusion applications



📅 4 Jul 2022, 15:00

PechaKucha

Oral session 1

🕒 8m

📍 Auditorium (Orto Botanico)

Speaker

👤 Ocean Wong (Culham Centre for F...

Description

Activation foil neutron spectrum unfolding was first devised over 50 years ago as a technique for measuring the neutron spectrum in research reactors due to its sensitivity to high energy neutrons.

Coincidentally, it will be the primary neutron spectrometry method in future fusion power-generating reactors. Due to its ability to withstand arbitrarily high flux, temperature and magnetic field strength, it is the perfect candidate for measuring the first wall spectra of future fusion reactors.

Knowledge of the neutron spectrum in the first wall will be necessary for improving the future designs of Tritium Breeding blanket concepts[1] which are necessary for fuel self-sufficiency, and monitoring power level variations[2], and the neutron damage that components experience. This will dictate the operational lifetime and therefore financial feasibility of fusion as an energy source.

However, our current understanding of unfolding only allows us to unfold fission spectra and accelerator spectra with confidence, but does not allow the generalization of such knowledge to power-generating fusion reactor spectra.

To pave the way to using activation foils in commercialized fusion energy, we adapted existing unfolding algorithms, and have devised a method to select the optimal set of foils to be used for any given expected spectrum. A foil selection program was created to recommend a list of foils with maximum unfolding accuracy to the experiment designer.

Primary authors

👤 Prof. Alison Bruce (University of Brighto...

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👤 Ocean Wong (Culham Centre for F...

👤 Dr Robin Smith (Sheffield Hallam Un...

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