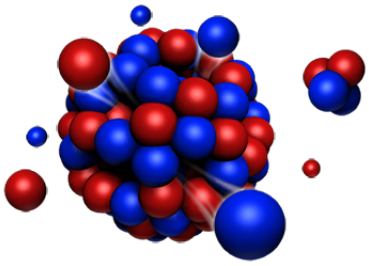

Contribution ID: **210** Type: **Oral Presentation**

The ^{10}B based Jalousie neutron detector: its current status and its employment for DREAM and MAGIC at ESS

Jalousie is a modularized neutron detector in production phase, developed to serve as alternative for classical ^{3}He position sensitive detector tubes as used for large neutron scattering instruments. The design has been fully produced for the POWTEX instrument at FRM II, is now under production for DREAM and under design for MAGIC at ESS. The neutron converting material is 10Boron and replaces ^{3}He. The comparatively small overall detection efficiency of an individual layer is enhanced by tilting with 10° the layer towards the incoming neutron path, thus increasing the effective absorption depth by a factor of 6. Additionally, 8-12 such boron layers are arranged along any neutron path to further enhance overall detection efficiency to 54%-63% at 1 Ǎ.
A Jalousie detector system comprises many lamella shaped individual modules, where each makes up an enclosed multi wire proportional chamber with two anode planes and one cathode plane that carry the converter layers. Several such lamellae, when stacked and tilted with respect to the neutron paths, may be arranged to cover square meter sized planes, or alternatively a cylindrical surface to enclose a scattering sample. A solution for the cylinder endcap coverage has also been developed. Spatial resolution of 5-7 mm (FWHM) and down to 1 mm (FWHM) in a special configuration along one dimension as well as time of flight resolution of 3-10 µs (FWHM) may be customized through design parameters.
The detector concept together with measurement results, the particular technical challenges encountered and the current state of these projects will be presented.

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Session Classification: Instruments

Track Classification: Instrument