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## **The 10B based JALOUSIE neutron detector: its current status and its employment for POWTEX at FRM II as well as DREAM and MAGiC at ESS**

*Thursday, 8 December 2022 13:05 (35 minutes)*

JALOUSIE is a modularized neutron detector concept that has been realized for the first time in POWTEX. It was developed to serve as alternative for classical  $^3\text{He}$  position sensitive detector tubes as used for large neutron scattering instruments. POWTEX has been fully instrumented at FRM II along this concept. Further JALOUSIE based systems are under production for DREAM and MAGiC at ESS.

The comparatively small overall detection efficiency of an individual  $^{10}\text{B}_4\text{C}$  layer is enhanced by tilting with  $10^\circ$  the layer towards the incoming neutron path, thus increasing the effective absorption depth by a factor of 6. Additionally, 8-12 such conversion layers are arranged along any neutron path to further enhance overall detection efficiency to 54%-63% at 1 Å. Consequently, JALOUSIE provides a 3-dimensional detection volume structured into highly granular voxels for readout. 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  $\mu\text{s}$  (FWHM) may be customized through design parameters.

The detector concept will be presented together with test measurement results, which document the seamless operation of the detector system. Further variants of the concept as implemented at DREAM and MAGiC will be indicated.

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