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Neutron detection in the frame of spatial magnetic spin resonance

This presentation is related to neutron detection in the context of the polarized neutron optics technique of spatial magnetic spin resonance. By this technique neutron beams may be tailored in their spectral distribution and temporal structure. We have performed experiments with very cold neutrons at the high-flux research reactor of the Institut Laue Langevin in Grenoble to demonstrate the potential of this method in combination with a travelling wave magnetic resonator field. A combination of spatially and temporally resolving neutron detection allowed us to characterise a prototype neutron resonator. By using a neutron detector with the properties mentioned we were able to record neutron time-of-flight spectra, assess and minimize neutron background and provide for normalization for the spectra owing to variations in reactor power and ambient conditions at the same time. All these features may be achieved by a single detector as will be illustrated by our presentation. We will present the characteristics of the detector and its acquisition system and exemplify the advantages of the detection technique by selected neutron spectra that demonstrate the potential of the spatial neutron magnetic resonance technique.

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