



Contribution ID: 221

Type: **Poster**

MIEZE spectroscopy at shorter wavelengths

Monday, 20 March 2023 16:00 (2 hours)

We present a MIEZE (Modulation of intensity with zero effort) set-up for high-resolution neutron spectroscopy at momentum transfers up to 3\AA^{-1} , energy transfers up to $\sim 20\text{meV}$ and an energy resolution in the μeV -range using both thermal and cold neutrons. One prominent advantage of MIEZE compared to classical neutron spin-echo is the possibility to investigate spin-depolarizing samples or samples in strong magnetic fields without loss of signal amplitude and intensity. This allows for the study of spin fluctuations in ferromagnets, and facilitates the study of samples with strong spin-incoherent scattering. The use of thermal neutrons increases the range of validity of the spin-echo approximation towards shorter spin-echo times. In turn, the thermal MIEZE option for greater ranges (TIGER) closes the gap between classical neutron spin-echo spectroscopy and conventional high-resolution neutron spectroscopy techniques such as triple-axis, time-of-flight, and back-scattering.

To illustrate the feasibility of TIGER we present the details of an implementation at the beamline RESEDA at FRM II by means of an additional velocity selector, polarizer and analyzer.

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Session Classification: Poster Session MONDAY

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