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Focal length tuning in MIEZE Spectroscopy

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The MIEZE technique relies on a fast sinusoidal neutron intensity modulation up to the MHz range, generated by the rotation of the neutron spin in radio-frequency spin flippers, and subsequent conversion to an intensity modulation by a spin analyzer.
This intensity modulation is washed out due to the neutron velocity dispersion.
By carefully choosing the rotation frequencies as well as the distances between sample, detector and spin flippers, a focal point in space is created, the echo point.
Here, the neutron detector is placed. Introducing a field subtraction coil (NSE coil) between the spin flippers, extends the dynamic range of the MIEZE technique towards the low energy resolution end, providing an overlap with conventional spectroscopy techniques. Additionally, the coil can be used to tune the position of the echo point. We will show how the use of a field subtraction coil unlocks the full potential of a MIEZE setup.

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