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New Magnets for Correlated Electron Systems at MLZ

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Strongly correlated electronic systems from the field of magnetism and superconductivity are one of the key fields of research where neutron diffraction and spectroscopy play a pivotal role. At MLZ, several high impact discoveries have been achieved over the last decade directly revealing new functionalities towards future data storage or logical devices. Further, new instrumental concepts and more brilliant neutron sources enable the detection of even weaker, often diffuse signals. This provides a key step towards the exploration of new physics by extending the available parameter range of the sample environment –particularly for (quantum) disordered systems or exotic electronic ordering phenomena. Besides temperature, pressure and electrical field, the application of magnetic fields plays a pivotal role in tuning the properties of strongly correlated electronic systems. Within the MORIS program, we propose the purchase of three new magnets, all based on new, dry cryogen free high temperature superconducting (HTS) technology.
These are:
(i) A 10T high performance compensated, asymmetric horizontal magnet optimized for small angle neutron scattering (SANS), reflectometry and the resonance spin echo technique MIEZE.
(ii) An ultra-low background magnet for time-of-flight (TOF) neutron scattering.
(iii) A dedicated triple-axis-spectroscopy horizontal magnet with a large-opening-angle and a field strength of ~5T with a dilution unit.

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