

# SOME EXOTIC MAGNETIC STATES AT HIGH MAGNETIC FIELDS

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An indispensable parameter to study strongly correlated electron systems is the magnetic field. Application of high magnetic fields allows the investigation, modification and control of different states of matter. Specifically for magnetic materials experimental tools applied in such fields are essential for understanding their fundamental properties. Frustrated magnets provide a promising avenue for realizing exotic quantum states of matter. In my talk I focus on selected high-field studies of frustrated and low dimensional magnetic materials that have been shown to host a broad range of fascinating new and exotic phases. This includes a magnonic liquid and magnonic superfluid, robust magnetization and magnetostructural plateaus, supersolidity, and a nematic phase. Typically the spin-strain interactions play an important role in these unusual states. In my presentation I show some recent magnetization and ultrasound results obtained in selected frustrated and low dimensional spin systems [1-3].

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[1] V. Tsurkan, S. Zherlitsyn, L. Prodan, V. Felea, P.T. Cong, Y. Skourski, Zhe Wang, J. Deisenhofer, H.-A. Krug von Nidda, J. Wosnitza, and A. Loidl, *Science Advances* **3**, e1601982 (2017).

[2] Zhe Wang, D. L. Quintero-Castro, S. Zherlitsyn, S. Yasin, Y. Skourski, A. T. M. N. Islam, B. Lake, J. Deisenhofer, and A. Loidl, *Phys. Rev. Lett.* **116**, 147201 (2016).

[3] J. Wosnitza, S. Zvyagin, and S. Zherlitsyn, *Rep. Prog. Phys.* **79**, 074504 (2016).