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Neutron depolarization measurements on HgCr2Se4 under pressure

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The pressure dependent magnetic phase diagram of chromium spinel $HgCr_2Se_4$ was investigated up to 6 GPa. Hydrostatic pressure was applied with purposely built diamond anvil cells. The magnetic state of the samples was probed by neutron depolarization, where a pair of focusing neutron supermirror guides was used, increasing the signal intensity by a factor 20. The use of the neutron guides allowed forn an increase of an order of magnitude in the signal to noise ratio while maintaining the exposure time, compensating for the very small sample size insdie the diamond anvil cell. Given the strong competition between FM and AFM exchange in $HgCr_2Se_4$ and parent compounds, the different ground states and physical phenomenon observed are likely a consequence of complex coupling of structural distortions with the magnetic degrees of freedom.

Primary author: JORBA, Pau

Co-authors: LOIDL, Alois (Center for Electronic Correlations and Magnetism, University of Augsburg); PFLEIDERER, Christian; SEIFERT, Marc; SCHULZ, Michael; BÖNI, Peter (Technische Universität München); SCHMAKAT, Philipp; Dr TSURKAN, Vladimir (Experimentalphysik V, Institut für Physik, Universität Augsburg)

Presenter: JORBA, Pau

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