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Magnetic Correlations in URu_2Si_2 under Chemical and Hydrostatic Pressure TRAVIS WILLIAMS, ADAM ACZEL, Oak Ridge National Laboratory, COLLIN BROHOLM, Johns Hopkins University, WILLIAM BUYERS, Chalk River Laboratories, JUSCELINO LEAO, NIST Center for Neutron Research, GRAEME LUKE, McMaster University, JOSE RODRIGUEZ-RIVIERA, NIST Center for Neutron Research, MATTHEW STONE, Oak Ridge National Laboratory, MURRAY WILSON, McMaster University, ZAHRA YAMANI, Chalk River Laboratories — URu_2Si_2 has been an intense area of study for the last 30 years due to a mysterious hidden order phase that appears below $T_0 = 17.5$ K. The hidden order phase has been shown to be extremely sensitive to perturbations, being destroyed quickly by the application of a magnetic field, hydrostatic or uniaxial pressure, and chemical doping. While attempting to understand the properties of URu_2Si_2, neutron scattering has found spin correlations that are intimately related to this hidden order phase and which are also suppressed with these perturbations. Here, I will outline some recent neutron scattering work to study these correlations in two exceptional cases where the hidden order phase is enhanced: hydrostatic pressure and chemical pressure using Fe- and Os-doping. In both of these cases, T_0 increases before an antiferromagnetic phase emerges. By performing a careful analysis of the neutron data, we show that these two phases are much more related than had been previously appreciated. This implies that the hidden order is likely compatible with an antiferromagnetic ground state, placing constraints on the nature of the missing order parameter.

Travis Williams
Oak Ridge National Laboratory

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