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Magnetic Phase Transition in Rare Earth Metal Holmium at Low Temperatures and High Pressures SARAH THOMAS, WALTER UHOYA, LOWELL WENGER, YOGESH VOHRA, University of Alabama at Birmingham — The heavy rare earth metal Holmium has been studied under high pressures and low temperatures using a designer diamond anvil cell and neutron diffraction using a Paris-Edinburgh Cell at the Spallation Neutrons and Pressure (SNAP) Diffractometer. The electrical resistance measurement using designer diamond shows a change in slope at the Neel temperature as the temperature is lowered at high pressures. At atmospheric pressure TN=120 K and decreases with a slope of -4.7 K/GPa as pressure is increased, until reaching 9 GPa, at which pressure the magnetic ordering is lost. This correlates to the pressure at which there is a structural change from an hcp phase to an α-Sm structure. Neutron diffraction measurements made above and below the Neel temperature at increasing pressures show the reversibility of the change between the paramagnetic and antiferromagnetic states. The parameters of the low temperature incommensurate magnetic phase will be reported at various pressures.

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