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Probing Magnetic Exchange in Dilute Magnetic Semiconductors by Neutron Scattering ZACHARY WIREN, TOMASZ GIEBULTOWICZ, HENRYK KEPA, Physics Department, Oregon State University, CRAIG BROWN, JUSCELINO LEAO, National Institute of Standards and Technology Center for Neutron Research — There is presently much interest in magnetic transition metal doped group II-VI semiconductors ($A^{II}_{1-x}Mn_xB^{VI}$). It is theorized making them strongly p-type would allow materials to remain ferromagnetic at room temperature. Since this interaction must compete with the intrinsic antiferromagnetism of the material, neutron scattering experiments were undertaken to better understand the antiferromagnetic interactions in these materials. Primarily, the study focused on the effects altering the distance between magnetic atom has on the exchange interaction. Inelastic neutron scattering was undertaken to determine the exchange constant in various materials while neutron diffraction was used to determine the distances involved in the exchange interaction. There appears to be an overall distance dependance in the materials, but high pressure studies undertaken show the functionality differers between the overall trend and the individual materials. Results will be discussed for Zn(Mn)O, Zn(Mn)S, Zn(Mn)Se, Zn(Mn)Te, and Cd(Mn)Te. The data taken is also analyzed to determine more distant interactions.

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