Viscosity of the strongly coupled strongly magnetized one component plasma[1] BRETT SCHEINER, Los Alamos National Laboratory, SCOTT BAALRUD, University of Iowa — The viscosity tensor of the magnetized one-component plasma, consisting of five independent shear viscosity coefficients, a bulk viscosity coefficient, and a cross coefficient, is computed using equilibrium molecular dynamics simulations and the Green-Kubo relations. A broad range of Coulomb coupling and magnetization strength conditions are studied. Magnetization is found to strongly influence the shear viscosity coefficients when the gyrofrequency exceeds the Coulomb collision frequency. Three regimes are identified as the Coulomb coupling strength and magnetization strength are varied. The Green-Kubo relations are used to separate kinetic and potential energy contributions to each viscosity coefficient, showing how each contribution depends upon the magnetization strength. The shear viscosity coefficient associated with the component of the pressure tensor parallel to the magnetic field, and the two coefficients associated with the perpendicular component of the pressure tensor, are all found to merge to a common value at strong Coulomb coupling.

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