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Landau Quantization in Laser Plasma Interactions and Magnetic White Dwarf Stars VITHAL L. PATEL, Berkeley Research Associates, Inc., JAECHUL OH, Research Support Instruments, Inc. — Recently ultrahigh magnetic fields up to 0.7 Giga Gauss have been measured in high intensity laser interactions with matter [1]. The laser induced GG magnetic fields in the laboratory are possible and even larger ultrahigh fields naturally occur in neutron stars. Existence of such large magnetic fields significantly affects EOS through strong Landau quantization effect [2]. However weak Landau quantization may occur in high density plasmas with magnetic fields in MG range. We consider degenerate ($T < T_B$) and high density ($\rho > \rho_B$) plasmas with 100-500 MG in the laboratory as well as naturally occurring in the outer layers of hydrogen-helium of magnetic white dwarfs. Electrons populate several higher Landau levels in this regime. If the weak quantization effect manifests then quantities determined by thermal electrons near the Fermi level such as entropy and transport properties of plasmas are affected. This research was performed in Laser Plasma Branch, Plasma Physics Division, Naval Research Laboratory and was supported by DOE/NNSA. [1] U. Wagner, et. al., Phys. Rev. E 70, 026401 (2004). [2] S. Eliezer, et. al., Phys. Plasmas 12, 052115 (2005).

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