

Magnetization of 4/7 Phase on ^3He or ^4He Monolayer Preplated Graphite in high magnetic fields

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Antiferromagnetic commensurate phase of 2-dimensional solid ^3He on the graphite (4/7 phase) is made strongly frustrated by geometrical frustration and competition of multiple spin exchange. The ground state of 4/7 phase is suggested to be a quantum spin liquid state with nearly zero or extremely small spin gap [1, 2]. It is predicted that the magnetization of 4/7 phase has a plateau at $M/M_{\text{sat}} = 1/2$, in which the ground state is uuud state [3, 4].

We have measured the magnetization curve of the 4/7 phase on ^3He and ^4He preplated Graphite with a Faraday-type magnetometer. It employs a double gradient coil system to eliminate a large back ground from graphite as a substrate and copper as a thermal link. The results from both samples at 1.1 mK show that the magnetization of 4/7 phase is not saturated even at 10 T (FIG.1), suggesting the existence of magnetization plateau.

- [1] K. Ishida et al., Phys. Rev. Lett. 79, 3451 (1997).
- [2] R. Masutomi et al., Phys. Rev. Lett. 92, 025301 (2004)
- [3] G. Misguich et al., Phys. Rev. Lett. 81, 1098 (199)
- [4] T. Momoi et al., Phys. Rev B 59, 9491 (1999)

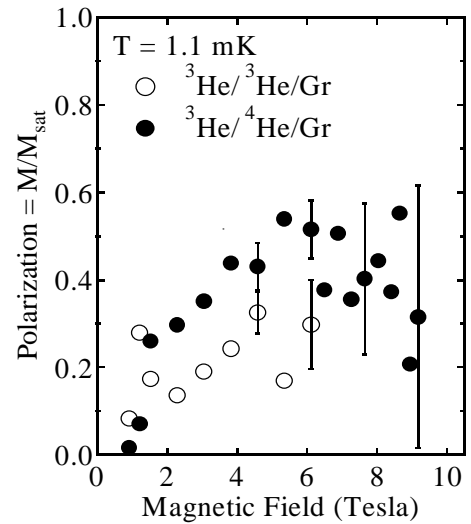


FIG.1: Polarization of 4/7 phase