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Fast Spin Relaxation in Solid ^{3}He MATTHIAS KATH, ERWIN SCHUBERTH, WALTHER-MEISSNER-INSTITUTE TEAM — To determine the spin structure of the nuclear magnetic ordered phases of solid ^{3}He, neutron scattering would be the method of choice. For this experiment it is crucial to grow a single crystal within the sinter needed for cooling the solid to temperatures of the order of 0.5 mK and to aborb the major part (> 90 %) of the heat generated by the neutron capture. In this respect we studied the growth of crystals in Ag sinters of different pore sizes to find an optimal way to obtain preferably single crystalline samples. The ordered phases were indicated by a drop of the NMR intensity for the U2D2 phase and by an increase (30 %) for the high field phase. Just below T_{Neel}(0.9 mK) we found a line splitting as expected for the U2D2 phase a) of about 20 kHz to the high frequency side of the Larmor line at 1980 kHz and b) 4 kHz on its low frequency side at 240 kHz. For unknown reasons the Larmor line itself was absent in the U2D2 phase. In the paramagnetic phase T_2 turned out to be about 4.6 ms. T_1 measurements were hampered by an unexpected fast initial recovery process prior to the longitudinal spin relaxation T_1 250 ms at 10 mK). The efficient recovery of M_z is possibly due to a sizeable demagnetizing field which is so strong that just above T_{Neel} T_1 could not be determined.

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