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NMR evidence of a high field phase transition in κ-(ET)Cu(NCS)$_2$ JEFFREY WRIGHT, W.C. CLARK, UCLA, ELIZABETH PRETTNER, Florida St., PHIL KUHNS, ARNEIL REYES, J.S. BROOKS, NHMFL, JOHN SCHLUETER, Argonne National Lab, STUART BROWN, UCLA — The anisotropic electronic properties of the organic superconductor κ-(BEDT-TTF)$_2$Cu(NCS)$_2$ make it an excellent candidate for inhomogeneous superconductivity (FFLO state) when the magnetic field is applied in-plane, so as to avoid orbital suppression of the superconductivity. Results of various previous measurements have been interpreted as supporting the existence of an FFLO state for fields B$\sim$21-22T. In this work, ^{13}C NMR measurements were used to probe the hyperfine fields in the range of B=14-27T and T=0.5-1.6K. A sharp peak in the relaxation rate 1/T1(B) at B$\sim$22T signals a phase transition associated with a turn-on of spin susceptibility, while evolution the spectrum with field indicate the system remains superconducting at higher fields. Additionally, only small variations of the hyperfine fields are observed for external fields B=14-20T, and we discuss this observation in relation to the superconducting order parameter symmetry.

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