Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Spin polarization measurement of the $\nu = 5/2$ fractional quantum Hall state via NMR LARS TIEMANN, NTT and ERATO-JST, GERARDO GAMEZ, NORIO KUMADA, NTT, KOJI MURAKI, NTT and ERATO-JST — The $\nu = 5/2$ fractional quantum Hall state has attracted much interest due to its possible non-Abelian statistics, which are expected for the *Pfaffian* state. While the *Pfaffian* model assumes full spin polarization, recent optical experiments suggest a spin-unpolarized ground state at $\nu = 5/2$ instead [1, 2], and have thus posed a new challenge for understanding the true nature of the 5/2 state. Here, we report a spin polarization measurement of the $\nu = 5/2$ state using resistively-detected NMR and demonstrate its full polarization. The measurements were performed at $T = 10$ mK on a gated 30-nm quantum well at 4.4 T. For the resistive read-out of the nuclear resonance frequencies, we used the $\nu = 2/3$ spin transition by comparing its R_{xx} prior to and after the application of an *rf* pulse at $\nu = 5/2$. The NMR spectrum at $\nu = 5/2$ is shifted to lower frequencies from the one at $\nu = 2$, where the system is unpolarized, indicating a nonzero polarization at $\nu = 5/2$. Our analysis, which considers the changes of the sub-band wave function under a gate bias, indicates that the polarization at $\nu = 5/2$ is very close to its maximal value. This, in turn, gives support for the Pfaffian state.
[1] T. D. Rhone, APS March Meeting 2010, Y2.00003 [2], M. Stern *et al.*, Phys. Rev. Lett. **105**, 096801 (2010).

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Date submitted: 23 Dec 2010 Electronic form version 1.4