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Thermopower and the Fractional Quantized Hall Effect in the N=1 Landau Level[1] W.E. CHICKERING, J.P. EISENSTEIN, Caltech, L.N. PFEIFFER, K.W. WEST, Princeton — Having recently eliminated an issue involving long thermal time constants [1], we are now able to resolve diffusion thermopower deep into the fractional quantized Hall effect (FQHE) regime. In this talk we report measurements of thermopower in the first excited (N=1) Landau level as a continuous function of magnetic field down to temperatures as low as 30mK. Above 50mK we can clearly resolve the $\nu = 5/2$ as well as $\nu = 7/3$, $8/3$, and $14/5$ FQHEs in both the electrical and thermoelectrical transport. Below 50mK a prominent feature of the electrical transport in the first excited Landau level is the Re-entrant Integer Quantized Hall Effect (RIQHE) which is associated with insulating collective phases [2]. In this temperature regime the thermopower exhibits a series of intriguing sign reversals that are as yet not fully understood. We will conclude with a brief discussion of the connection between thermopower and the entropy of the 2D electron system. This connection is invoked by a recent prediction [3] of the thermopower at $\nu = 5/2$, which assumes the ground state is the non-Abelian Moore-Read paired composite fermion state.

[1] Chickering, Phys. Rev. B 81, 245319 (2010)
[2] Eisenstein, Phys. Rev. Lett. 88, 076801 (2002)
[3] Yang, Phys. Rev. B 79, 115317 (2009)

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