

Abstract Submitted
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High bandwidth measurements of large area 2-Dimensional systems using rf reflectometry L.J. TASKINEN, Department of Physics, PL 35 (YFL), FI-40014 University of Jyvaskyla, R.P. STARRETT, T.P. MARTIN, A.P. MICOLICH, A.R. HAMILTON, M.Y. SIMMONS, School of Physics, University of New South Wales, Sydney NSW 2052, Australia, D.A. RITCHIE, Cavendish Laboratory, University of Cambridge, Cambridge CB3 0HE, United Kingdom, M. PEPPER, Department of Electronic and Electrical Engineering, University College London, London, WC1E 7JE, United Kingdom — We have embedded AlGaAs/GaAs based 2 dimensional electron and hole systems in a large area Hall bar into an impedance matching LC circuit terminating a transmission line, and used rf reflectometry to measure temporal changes in the resistance of the device at mK temperatures. We have shown that, contrary to initial estimations, it is feasible to use this method with large 2D devices despite the large capacitance, increasing the measurement bandwidth up to tens of megahertz [1]. As an example, we have mapped the Landau level evolution in a 2DHS as a function of magnetic field and gate voltage much faster than would be possible using standard lock-in technique [1].

[1] L. J. Taskinen et al., Rev. Sci. Inst. **79**, 123901, (2008).

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