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Utilizing On-Chip Resonant Cavities for Magnetic Resonance Studies KYLE SERNIAC, MATHEW MARTENS, Florida State University and the National High Magnetic Field Laboratory, SYLVAIN BERTAINA, Faculte des Sciences et Techniques and Universite Aix-Marseille, IRINEL CHIORESCU, Florida State University and the National High Magnetic Field Laboratory — We studied an Electron Spin Resonance (ESR) setup utilizing a balanced bridge in conjunction with a lock-in detector to be used at the low temperature attained by a dilution refrigerator. ESR measurements were performed on a spin 1/2 DPPH sample at room temperature. The setup uses a microstrip line, which has recently attracted a lot of interest due to its high sensitivity and low noise baseline. Electronic spin excitation of the sample was achieved through use of an “omega” shaped microstrip cavity with resonant frequency of 17.4 GHz, which concentrates the magnetic field in a small region where the sample is placed. A homemade heterodyne detector was used for signal detection with and without a balanced magic-T bridge and lock-in amplifier. Direct measurements were also performed using a fast digital acquisition card.

Kyle Serniak
Florida State University and the National High Magnetic Field Laboratory

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