

Abstract Submitted  
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**dc SQUID based Johnson Noise Measurements of a  $3\text{k}\Omega$  Resistor at mK temperatures**<sup>1</sup> VIDHI SHINGLA, Purdue University, ETHAN KLEINBAUM, Princeton University, GABOR CSATHY, Purdue University — Johnson noise measurement is a useful technique for primary thermometry of charge carriers. However, Johnson noise of  $\text{k}\Omega$  resistors at mK temperatures is lower than typical noise of room temperature electronics. Therefore, lower noise amplifiers are needed to make such measurements. Low temperature amplifiers based on cooled High Electron Mobility Transistors (HEMTs) are often employed, however these offer low noise operation at MHz frequencies only. We present an alternative circuit which operates at low frequencies which is based on a dc SQUID. We demonstrate that our circuit does not contribute appreciable noise to the Johnson noise of a  $3.25\text{ k}\Omega$  resistor down to  $16\text{mK}$ , enabling Johnson noise thermometry.

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