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Measurements of higher-order moments of the persistent current in normal metal rings WILL SHANKS, ANIA BLESZYNSKI JAYICH, BRUNO PEAUDECERF, ERAN GINOSSAR, LEONID GLAZMAN, Yale University, FELIX VON OPPEN, Freie Universitat Berlin, JACK HARRIS, Yale University — A normal metal ring exhibits a persistent electrical current provided its circumference is less than the electron's phase coherence length and its temperature is less than the Thouless temperature. The amplitude of the persistent current is a random function of the ring's disorder configuration. To date, theory and experiments have focused on measuring the variance of the distribution from which the persistent current amplitude is drawn. We have measured persistent currents in arrays of normal-metal rings over a wide range of magnetic fields, or equivalently, over many independent realizations of the disorder potential. This data allows us to produce a histogram of the current amplitude and determine its higher order moments. We find these higher order moments are consistent with a Gaussian distribution for the persistent currents. We also directly confirm that the amplitudes of different harmonics of the currents' Aharonov-Bohm oscillations are uncorrelated.

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