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Role of dissipation in realistic Majorana nanowires[1] CHUNXIAO LIU, University of Maryland, College Park, S. DAS SARMA, JAY D. SAU COLLABORATION — We carry out a realistic simulation of Majorana nanowires in order to quantitatively (or at least semiquantitatively) understand the latest high quality experimental data, and in the process, develop a comprehensive picture for what physical mechanisms may be operational in realistic nanowires leading to the discrepancies between the minimal theory and the experimental observations (e.g. weakness of the Majorana conductance peak, breaking of particle-hole symmetry). Our focus is on understanding specific intriguing features in the data, and our goal is to establish matters of principle controlling the physics of the best possible nanowires available in current experiments. Based on our current work, we identify finite dissipation, finite temperature, multisubband effects, and the nature of the finite barrier at the tunnel junction as the four most important physical mechanisms leading to the discrepancies. Our theoretical results including these realistic effects agree well with the best available experimental data in ballistic nanowires.

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