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Interaction effects in proximity-coupled spin-orbit quantum wires[1] RONNY THOMALE, Institut fuer Theoretische Physik und Astrophysik, Universitaet Wuerzburg (Germany) — We review recent progress on understanding interaction effects in spin-orbit quantum wires in the presence of a magnetic field and a proximity-coupled superconductor. With the use of adapted density matrix renormalization group techniques, we are able to compute the low-energy tunneling density of states in the presence of interactions. This enables us to make a further step towards a realistic simulation of the experimental scenario. Among other aspects, we analyze how an interaction-driven transition between a topologically trivial superconducting state and a topologically non-trivial state with Majorana edge modes relates to other tuning parameters. In particular, we contemplate on experimentally measurable consequences of interactions such as zero bias peak broadening or gap closing modes at the topological phase transition, and discuss further models accessible through our numerical approaches.

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Ronny Thomale
Institut fuer Theoretische Physik und Astrophysik,
Universitaet Wuerzburg (Germany)

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