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Realistic models for Majorana wires ALEXEY SOLUYANOV, ETH Zurich, ROMAN LUTCHYN, CHETAN NAYAK, BELA BAUER, Microsoft Research Station Q, MATTHIAS TROYER, ETH Zurich — We construct realistic effective models to theoretically facilitate the experimental search for Majorana modes in quantum wires. Starting with an accurate first-principles calculation, we provide a detailed discussion of finite size and multiband effects, and of the spin-orbit splitting. We also present a thorough consideration of proximity induced superconductivity, extensively supporting it with numerical evidence. The comparison of our results to previously used models and actual experiments is done.

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