

Abstract Submitted
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Compressibility as a probe of topological quantum phase transitions in 1D systems¹ DAVID NOZADZE, NANDINI TRIVEDI, Department of Physics, The Ohio State University, Columbus, OH 43210, USA — We investigate the behavior of the compressibility κ in the Kitaev chain using the Bogoliubov-de Gennes approach. For a closed chain, we show that the topological phase transition is signaled by the divergence of κ at the quantum critical point tuned by the chemical potential. We also explore the effect of disorder on the local compressibility $\kappa(x)$. In the presence of disorder the compressibility across the transition becomes finite and the height of the peak becomes smaller with increasing disorder strength. Our results provide a direct method, the local compressibility, for detecting the quantum phase transition in a Kitaev chain that can be realized in superconductor-semiconducting nanowire hybrid structures with strong spin-orbit coupling.

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