Title:	Topological phase separation in an interaction fermion chain
Authors:	Agarwal, Shruti,
Keywords:	Topological separation interaction fermion
Issue Date:	Apr-2022
Publisher:	IISER Mohali
Abstract:	This thesis work aims to gain some basic understanding of band topology by exploring a toy model, interacting sawtooth chain composed of spinless fermions, which hosts topological superconductivity. Choosing a topological superconductor gives the space to explore the Majorana behavior of the edge modes obtained in the topological su- perconductor. The system is solved at the mean-field level using the Bogoliubov-de Gennes approach. Possible phases are characterized for this model, post verifying the results by applying it to a limiting case of the model - the Kitaev chain - and the topological behavior of the chain is confirmed by analyzing the edge states. Topo- logical phase transition is found to be first-order, which gives rise to a mechanism of producing a finite density of Majorana zero modes (MZMs) in a chain, other than the ones present at the edges, induced by quenched disorder. The topological invariant in bulk is computed using winding number and the mean field results are validated by DMRG calculations at selected points by the collaborators. [1]
URI:	http://hdl.handle.net/123456789/4175
Appears in Collections:	MS-17

Files in This Item:

File	Description	Size	Format	
Yet to obtain consent.pdf		144.56 kB	Adobe PDF	View/Open

Show full item record