

Abstract Submitted
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Topological Hofstadter problem in four dimensions with quantized Hall response CANON SUN, YI LI, Johns Hopkins Univ — We generalize the Hofstadter problem of two-dimensional quantum Hall systems to a time-reversal invariant Hofstadter problem in four dimensions (4D) based on a 4D quantum Hall model, where spin-1/2 particles are coupled to a Landau-type SU(2) gauge field via spin-orbit coupling. The non-trivial topology is manifested through the spatial separation of (3+1)d surface Weyl modes with opposite chiralities. We further investigate the bulk-edge correspondence in this 4D Hofstadter problem and show the presence of a quantized Hall response under parallel E and B fields as a consequence of the (3+1)d chiral anomaly. A possible realization of the 4D Hofstadter system in ultra-cold atomic systems via synthetic dimension is also proposed.

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