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Enhanced Calculation of Higher Order Topological axion insulator $EuIn_2As_2$ CHRISTOPHER SIMS, University of Central Florida — Topological insulators are materials that are insulating in the bulk and have relativistic surface states. Higher order topological insulators are the same, but the topological states exist in higher dimensions, these materials are realized in edge states that are a higher dimensional form of topological insulators. Axions are an ultralight particle that are a prime candidate for dark matter, however due tohier properties that are difficult to observe in nature. $EuIn_2As_2$ is an antiferromagnet has been predicted to be a higher order topological insulator (HOTI) and an axion insulator. However, recent experimental results disagree with the theoretical prediction. In this work, enhanced calculations are performed where the HOTI axion states exist in this material.

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