

Abstract Submitted
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Looking for Tidal Disruption Events in Virgo's Globular Clusters¹

WILLIAM HUANG, Lynbrook High School, ARJUN PADIYAR, Irvington High School, VIVIAN TANG, PIERO MADAU, PURAGRA GUHATHAKURTA, UC Santa Cruz, SCIENCE INTERNSHIP PROGRAM AT UC SANTA CRUZ TEAM — A great problem in modern astronomy is the apparent absence of Intermediate-Mass Black Holes (IMBHs). One possibility is that they lie in the centers of globular clusters, and if that were the case, one could find IMBHs using tidal disruption events (TDEs). TDEs occur when stars pass near enough to a black hole that they are disrupted, causing an observable, dramatic luminosity flare-up around the black hole. We estimate the rate of TDEs per globular cluster by assuming an empty loss cone in each globular cluster, taking into account the number density of stars and the two-body relaxation timescale. Then, we compute an estimate for the number of TDEs that should be observable based on a three-year observational period for the NGVS survey. Based on these estimates, we find roughly 80 TDEs should occur within the three-year span, but only 5 are likely to be detected. Additionally, we model a TDE's monochromatic luminosity as a superposition of the super-Eddington wind and a multi-layered accretion disk. We confirm that the luminosity generally does not follow the classical $t^{-5/3}$ curve, and in fact may have two peaks, although one is short-lived and hard to observe. These findings should serve as a baseline for future theory and observations on IMBHs.

¹This abstract is based on research that was carried out by high school students under the auspices of the Science Internship Program at the University of California Santa Cruz.

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