

A ZTF SURVEY FOR EVOLVED CATAclySMIC VARIABLES TURNING INTO EXTREMELY LOW-MASS WHITE DWARFS

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I will describe a systematic survey for mass-transferring and recently-detached cataclysmic variables (CVs) with evolved secondaries, which are progenitors of extremely low mass white dwarfs (ELM WDs), AM CVn systems, and detached ultracompact binaries. We select targets below the main sequence in the *Gaia* color-magnitude diagram with ZTF light curves showing large-amplitude ellipsoidal variability and orbital period $P_{\text{orb}} < 6$ hr. We have obtained many-epoch spectra for 21 objects selected this way, about half of the population with $G < 18$. We confirm all of them be completely- or nearly-Roche lobe filling close binaries. About half show evidence of ongoing mass transfer, which has just ceased in the other half. Most of the secondaries are hotter than *any* previously known CV donors, with temperatures $4700 < T_{\text{eff}}/\text{K} < 8000$. Remarkably, all secondaries with $T_{\text{eff}} \gtrsim 7000$ K appear to be detached, while all cooler secondaries are still mass-transferring. This transition likely marks the temperature where magnetic braking becomes inefficient due to loss of the donor's convective envelope. Most of the proto-WD secondaries have masses near $0.15 M_{\odot}$; their companions have masses near $0.8 M_{\odot}$. We infer a space density roughly 80 times lower than that of normal CVs and three times lower than that of ELM WDs. The implied Galactic birth rate is half that of AM CVn binaries. Most systems are well-described by MESA models for CVs in which mass transfer begins only as the donor leaves the main sequence. All are predicted to reach minimum periods $5 \lesssim P_{\text{orb}} / \lesssim \text{min}30$ within a Hubble time, where they will become AM CVn binaries or merge. This sample triples the known evolved CV population and offers broad opportunities for improving understanding of the compact binary population.