



PTF1 J071912.13+485834.0: An outbursting AM CVn system discovered by a synoptic survey

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We present extensive photometric and spectroscopic observations of PTF1 J071912.13+485834.0, an outbursting AM CVn system discovered by the Palomar Transient Factory (PTF). AM CVn systems are stellar binaries with some of the smallest separations known and orbital periods ranging from 5 to 65 minutes. They are believed to be composed of a white dwarf accretor and a (semi)-degenerate He-rich donor and are considered to be the helium equivalents of Cataclysmic Variables. We have spectroscopically and photometrically identified an orbital period of 26.77 ± 0.02 minutes for PTF1 J071912.13+485834.0 and found a super-outburst recurrence time of greater than 65 days along with the presence of "normal" outbursts - rarely seen in AM CVn systems but well known in super-outbursting Cataclysmic Variables. We present a long-term light curve over two super-cycles as well as high cadence photometry of both outburst and quiescent stages, both of which show clear variability. We also compare both the outburst and quiescent spectra of PTF1 J071912.13+485834.0 to other known AM CVn systems, and use the quiescent phase-resolved spectroscopy to determine the origin of the photometric variability. Finally, we draw parallels between the different subclasses of SU UMa-type Cataclysmic Variables and outbursting AM CVn systems. We conclude by predicting that the Palomar Transient Factory may more than double the number of outbursting AM CVn systems known, which would greatly increase our understanding of AM CVn systems.

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