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The NAVOO Project: photometry for AM CVn candidates

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Abstract

AM CVn systems are a subclass of cataclysmic variables in which two DB white dwarfs orbit in close, hydrogen-depleted systems with short orbital periods, typically between 5 and 65 minutes. The prototype system, AM CVn (also known as HZ9), was first discovered in 1957 by Greenstein and Matthews as a "peculiar" DB white dwarf, and in 1967, Smak discovered its characteristic 17-18 minute photometric variability.

Since the 1990s, the known population of AM CVn systems has grown from four to around seventy. This class now includes objects exhibiting superhump periodicities, magnetic accretors, and some eclipsing systems, all with diverse photometric variability. AM CVn systems are generally categorized into four subclasses: (i) Very short-period systems ($P_{\rm orb} < 10\,$min), also known as 'direct-impact' accretors, which have high accretion rates, no accretion disk, and show X-ray emission; (ii) Bright objects with $10\,{\rm min} < P_{\rm orb} < 20\,{\rm min}$, having high-mass accretion through a permanent accretion disk; (iii) Systems with $20\,{\rm min} < P_{\rm orb} < 40\,{\rm min}$, which show variable brightness states corresponding to low/high mass accretion regimes; and (iv) faint objects with $P_{\rm orb} > 40\,$min, characterized by low-mass accretion dominated by the mass transfer onto the primary white dwarf.

In this context, ASASSN-14mv stands out as a promising AM CVn candidate with unconfirmed orbital and superhump periods, limited study, and large photometric variability ($V \sim 14 - 20$). In 2023, we acquired unfiltered photometry using CAMELOT2@IAC80 and spectroscopy with IDS@INT to contribute to the study of its physical properties.

My poster in zenodo.org can be found here