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Clues to the evolution of helium WD-WD binaries from the Palomar Transient Factory

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The study of AM CVn stars - semi-detached He WD-WD binaries - has exploded in recent years thanks to long term light curves obtained by the Palomar Transient Factory. Systems are seen with binary periods ranging from about 5 minutes to about an hour. AM CVn stars are similar to dwarf novae in that they can undergo accretion disk outbursts. Systems with high dM/dt have steady disks in permanent outburst, whereas for very low dM/dt systems the disks are too cool to have outbursts. Disk instability theory gives a specific prediction for the zone of instability, therefore by matching the observed zone with the theoretical one we constrain $dM/dt(P_{\text{orb}})$, the rate of mass transfer versus orbital period. The inferred relation is consistent with expectations from stellar evolution. One also has predictions for the recurrence time for outbursts and outburst duration versus P_{orb} which can be compared to observations.

Author: CANNIZZO, John (UMBC)

Co-author: Dr NELEMANS, Gijs (Radboud Univ. Nijmegen)

Presenter: CANNIZZO, John (UMBC)

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