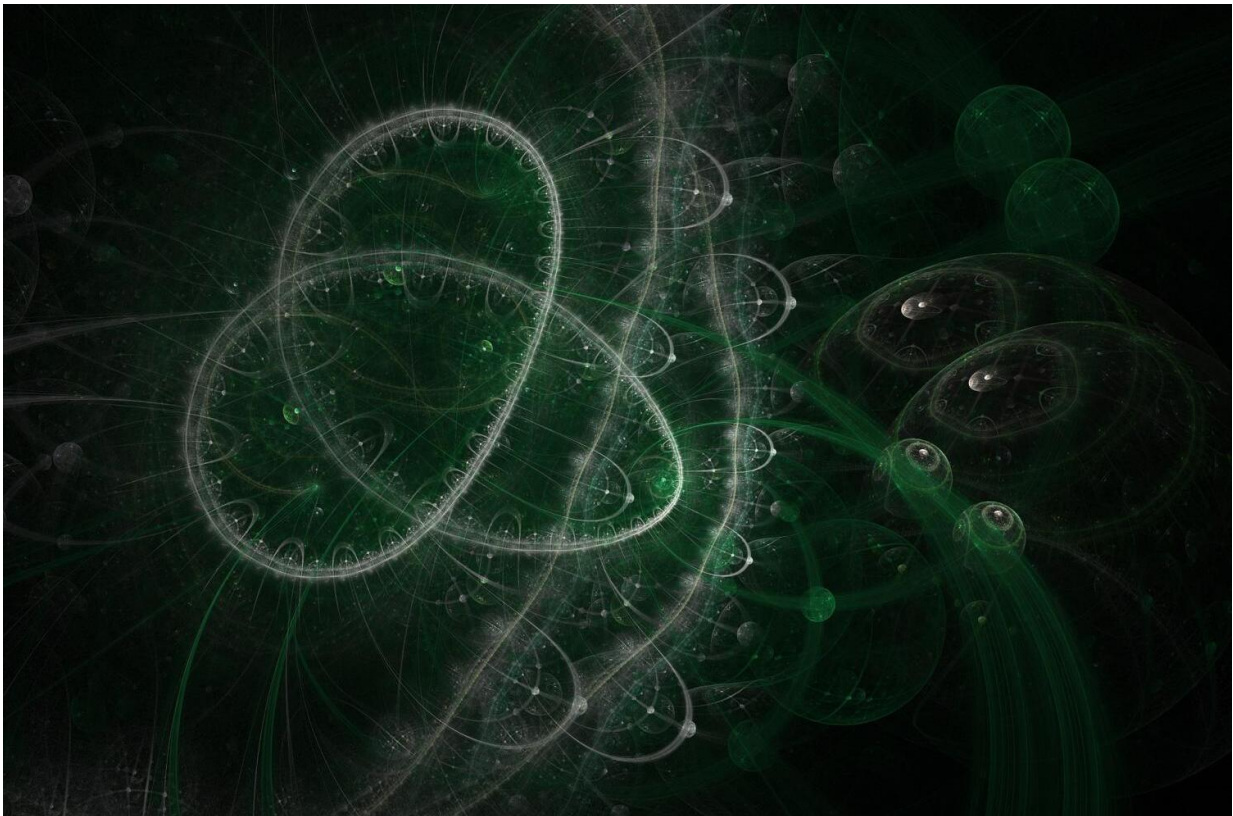


Researchers identify periods in asynchronous polars

April 29 2020, by Liu Jia



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A polar is a highly magnetic type of cataclysmic variables containing an accreting white dwarf and a low-mass donor star. Due to the magnetism, the white dwarf would synchronously spin, however, there are still

several asynchronous polars well confirmed with their angular velocities of the white dwarfs more or less than their orbital ones.

Because of the asynchronism, the complex interaction between the [magnetic field](#) and the accretion flow makes their [light](#) curves much more unstable, which then makes the identification of their periods unsure. Wynn and King in 1991 set a model for the analysis of the periods in the light curves of the intermediate polars, which is not suitable for the analysis of the light curves from polars. Due to the unstable light curves of the asynchronous polars, their [orbital periods](#) and the spin periods of the white dwarf components are hard to be identified.

In a recent study published in the *Astrophysical Journal*, Wang Qishan and his cooperators from Yunnan Observatories of the Chinese Academy of Sciences simulated the light curves of asynchronous and found out their periods.

The researchers first set up a more general spot model considering the effects of the changing aspect due to the white dwarf's spin and the variable feeding intensity caused by the asynchronism. This spot model can produce the power spectra compatible with the observations and can be applied for the period analysis of the optical and X-ray light curve.

They then carried out simulations on the different accretion modes using this model. The simulations put up a strong criterion for identification of periods from the asynchronous polars. The [simulation](#) results revealed that the long-term light curve makes the orbital signal prominent.

By fitting the power distribution of the simulative light curves to that from the observational ones, the researchers recognized the periods from CD Ind, BY Cam, and 1RXS J083842.1-282723.

More information: Qishan Wang et al. Spot Model for Identifications

of Periods in Asynchronous Polars, *The Astrophysical Journal* (2020).
[DOI: 10.3847/1538-4357/ab7759](https://doi.org/10.3847/1538-4357/ab7759)

Provided by Chinese Academy of Sciences

Citation: Researchers identify periods in asynchronous polars (2020, April 29) retrieved 9 April 2024 from <https://phys.org/news/2020-04-periods-asynchronous-polars.html>

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