



X-RAY ASTRONOMY 2019

Current Challenges and New Frontiers in the Next Decade

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Discussion on the orbital ephemeris of the ADC source X 1822-371

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The low mass X-ray binary systems (LMXBs) are composed of an accreting neutron star (NS) and a late-type companion (CS). They show very interesting spectral and timing characteristics. We distinguish some typical features in their light curve, like eclipses and dips, depending on the value of the inclination angle between the line of sight with respect to the perpendicular to the orbital plan of the system.

Through a timing analysis of their occurrence we can estimate this period and all the other orbital parameters which define the secular evolution of the system.

The source X 1822-371 is an eclipsing compact binary system with a period close to 5.57 hrs and an orbital period derivative \dot{P}_{orb} of $1.51(7) \times 10^{-10}$ s/s. The very large value of \dot{P}_{orb} is compatible with a super-Eddington mass transfer rate from the companion star, as suggested by X-ray and optical data. We estimated the number of orbital cycles and the delays of our eclipse arrival times spanning 40 yrs.

Fitting the delays, we found an orbital period $P_{orb} = 5.57062957(20)$ hrs and a \dot{P}_{orb} value of $1.475(54) \times 10^{-10}$ s/s.

The obtained results confirm the scenario of a super-Eddington mass transfer rate; indeed, we can exclude that the observed delays of the eclipse arrival times could be caused by a gravitational coupling between the orbit and the change in the oblateness of the companion star.

Topic

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