Total Eclipses of the Quiescent Neutron Star 4U 2129+47

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Abstract

4U 2129+47, along with Cyg X-2 and X1822−371, is one of the original "accretion disk corona" (ADC) sources, so named because these binary systems have exhibited partial eclipses that indicate X-ray emission with an effective size on the order of the disk circularization radius. Since 1982, however, 4U 2129+47 has been in quiescence. Recent *Chandra* observations indicate that the previously observed extended X-ray structure has collapsed. The total, and relatively rapid, eclipse seen provides strong upper limits to the size of the central X-ray source, as well as helps constrain the mass ratio in the system. Furthermore, *Chandra* observations reveal that much of the neutral hydrogen column in this system (previously measured with ROSAT observations averaged over the binary orbit) is actually intrinsic to the disk, and not extrinsic. This might cause the presumed $> 6\,\mathrm{kpc}$ distance to be re-evaluated, which in turn might have implications for the suggested flux differences between quiescent neutron stars and quiescent black holes.

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