The Luminous Supersoft Source, SSS₁, in NGC 300
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Abstract
The nearby galaxy NGC 300 is hosting two luminous transient supersoft sources with bolometric luminosities above $3 \times 10^{38}$ ergs/s (assuming black-body spectra with $kT \sim 60-70$ eV). For one of these, SSS₁, a periodic modulation of 5.4h was observed in a XMM-Newton observation from January 2001, but not 6 days earlier when the luminosity was much higher. We report here the detection of a new outburst from this source occurring during two long XMM-Newton observations from December 2016. The luminosity was similar as in December 2000, and the 0.2-2.0 keV light curve revealed again a periodic modulation, with a period of 4.68±0.26 h, significant only in the first part of the observation. Taking into accounts the large uncertainties (the 2001 period re-estimated at 5.7±1.1 h), the two values could be marginally compatible, and maybe associated with an orbital period. Thanks to these long exposures, an additional absorption feature is now visible in the spectra, that we modelled with an absorption edge. This component decreases the bolometric luminosity below $3 \times 10^{38}$ ergs/s and would therefore allow the presence of a white dwarf with a mass close to the Chandrasekhar limit. The system was found in outburst in 1992, 2000, 2008, and 2016 suggesting a possible recurrence period of about 8 years.

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