



Orbital Period Determinations for Four SMC Be/X-ray Binaries

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We present an optical and X-ray study of four Be/X-ray binaries located in the Small Magellanic Cloud (SMC). OGLE I-band data of up to 11 years of semi-continuous monitoring has been analysed for SMC X-2, SXP172 and SXP202B, providing both a measurement of the orbital period ($P_{\text{orb}} = 18.62, 68.90, \text{ and } 229.9$ days for the pulsars respectively) and a detailed optical orbital profile for each pulsar. For SXP172 this has allowed a direct comparison of the optical and X-ray emission seen through regular RXTE monitoring, revealing that the X-ray outbursts precede the optical by around 7 days. Recent X-ray studies by XMM-Newton have identified a new source in the vicinity of SXP15.3 raising doubt on the identification of the optical counterpart to this X-ray pulsar. Here we present a discussion of the observations that led to the proposal of the original counterpart and a detailed optical analysis of the counterpart to the new X-ray source, identifying a 21.7 d periodicity in the OGLE I-band data. The optical characteristics of this star are consistent with that of a SMC Be/X-ray binary. However, this star was rejected as the counterpart to SXP15.3 in previous studies due to the lack of H α emission.

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