INTEGRAL and RXTE observations of the X-ray pulsar OAO 1657–415

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The emission variability of the pulsar OAO 1657–415 in X- and gamma-rays were investigated on timescales of pulse and orbital periods using RXTE and INTEGRAL data. It was found that the source flux is affected by strong orbital modulations, including periodical eclipses of the X-ray source by its optical companion. During these eclipses, which lasted ~ 2 days, the pulsar flux was about 3 mCrab (18 – 60 keV), while at the peak it reached ~ 200 mCrab (18 – 60 keV). The evolution of the system orbital parameters were investigated, using RXTE data.

The source OAO 1657–415 shows episodes of acceleration and deceleration of the pulse period. Combining RXTE and INTEGRAL data we have derived a mean pulse period change rate, which is about 2.5 times lower, than previously reported in Ref. [1], where only RXTE data were used.

The pulsar is clearly detected up to 100 keV. The analysis of the pulsar spectrum for different orbital phases showed a stability of its shape. It can be approximated by a simple power law model ($\Gamma \sim 1.6$) with a high-energy cutoff ($E_{cut} \sim 25$ keV, $E_{fold} \sim 30$ keV), which is typical for objects of this class [2]. The strong photoabsorption with $N_H \sim 16 \times 10^{22}$ cm^{-2} was detected in the source spectrum.

References

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