

Abstract Submitted
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Numerical modeling of pulse shapes of the millisecond X-ray pulsar SAX J1808-3658¹ DENIS LEAHY, University of Calgary, SHARON MORSINK, University of Alberta — Numerical methods are developed for modeling X-ray pulse shapes for rapidly rotating neutron stars. The calculations include analytic approximations to the full General-Relativity neutron star metric and for ray-tracing in that metric. They also include time-delays, Doppler effects and oblateness of the rapidly rotating neutron star, which are all important for accurately modeling pulse shapes. The aim is to enable extraction of constraints on the neutron star's mass and radius. The analysis here includes RXTE observations of SAX J1808-3658 from the 1998, 2002 and 2005 outbursts. This is important since the observed pulse shape varies greatly. We can fit a consistent neutron star model to all of the observations by including a small amount of disk scattered light into the model. The resulting pulse shape model will be discussed together with new mass and radius constraints for SAX J1808-3658.

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