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Abstract:

Some of the most dramatic displays of General Relativity (GR) occur in binary pulsars. One of the best examples is the pulsar PSR J1906+0746. While pulsars are generally proverbially stable, the pulse profile of this young pulsar changes from month to month, as GR forces its spin axis to precess. From these GR effects, we determined the masses of the pulsar and its companion. We recently used the geodetic precession to also demonstrate the validity of the long-held geometrical model of pulsar polarisation. We performed five tests of GR in this system, including the most precise test of spin-precession for strongly self-gravitating bodies so far. We even reconstructed the polarised emission maps of the pulsar magnetic poles. Our line of sight has left the main-pulse emission region behind a few years ago. Our fits predict the interpulse, too, will disappear from sight, by 2028. The pulsar will only re-appear around 2080. We aim to further pursue our unique mapping exploration of pulsar poles. Only FAST can offer the sensitivity that this timing and pulse-profile study requires and we here propose to continue the campaign we started in 2021.