

THE BINARY PULSAR PSR J0737-3039A/B: ECLIPSES, ORBITAL MODULATION AND GR TESTS.

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The long awaited discovery of the binary radio pulsar system, PSR J0737-3039A/B, surpassed most expectations, both theoretical and observational, as a tool to probe general relativity, stellar evolution and pulsar theories. Unexpectedly, the faster pulsar A is eclipsed once per orbit while the slower pulsar B shows orbital-dependent variations of intensity. I will describe a model of eclipses which reproduces the complicated observed light curve down to intricate details. This allows a number of test of pulsar environment and of general relativity. The model provides a proof of the long standing assumption of dipolar magnetic fields of neutron stars and gives a tool to probe details of magnetospheric structure, plasma physics in relativistic regime and pulsar emission generation mechanisms. It also allows measurement of relativistic spin precession and yielded a qualitatively new test of theories of gravity in the strong-field regime.