Double pulsars and other relativistic neutron star binaries

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Pulsars observed as binary neutron stars allow to study a wide range of problems in astrophysics and fundamental physics. In particular, pulsars with a neutron star companion provide ideal test beds for probing relativistic gravity under strong-field conditions. Moreover, the study of relativistic effects like spin-orbit coupling and geodetic precession can be used as tools in our efforts to understand the birth events and resulting structure of neutron stars. The Double Pulsar, especially, is unique in its properties and provides an exciting laboratory for not only general relativity but also for plasma phsyics and solid state physics under extreme conditions. I will review the different manifestations of neutron star binaries in their applications for tests of general relativity and our understanding of neutron stars, paying particular attention to the double pulsar system.