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Fifty years of the Hulse-Taylor pulsar

Thursday 19 December 2024 09:00 (15 minutes)

In this talk, I will recount the original discovery of the first binary pulsar, PSR B1913+16 at the Arecibo Observatory, and the subsequent timing observations and the major results to emerge from this study, which include a precise tests of strong-field gravity, the confirmation of the existence of gravitational waves and the indication that merging neutron stars throughout the Universe are important, both as a source of heavy elements and of detectable gravitational waves. This discovery was an important motivation for the subsequent construction of gravitational wave detectors. I will then discuss the immense progress that has happened since in the field of tests of gravity theories with radio pulsars, which include much more precise tests of gravity theories with the Double pulsar (PSR J0737-3039A/B system), with a wide range of pulsar - white dwarf systems and the test of the universality of free fall with a millisecond pulsar in a triple star systems. I conclude by highlighting some exciting prospects for the near future.

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