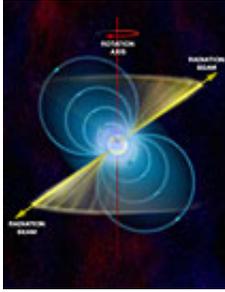


Astronomers discover fastest-spinning pulsar

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A team of astronomers led by McGill University graduate student Jason Hessels has discovered the fastest-spinning neutron star, or pulsar, ever found. The 20-mile-diameter superdense pulsar, which at 716 revolutions per second whirls twice as fast as the average kitchen blender, exceeds the previous record by nearly 100 revolutions per second.

The team, which also included Vicky Kaspi, McGill University physics professor and Canada Research Chair in Observational Astrophysics, made the discovery using the National Science Foundation's Robert C. Byrd Green Bank Telescope in Green Bank, West Virginia. Their work yields important new information about the nature of one of the most mysterious forms of matter in the universe.

Hessels, 26, is first author on the pulsar research, which will be published online by the journal *Science* on January 12. The Edmonton,

Alberta, native underscored the value of the discovery to the ongoing exploration of neutron stars. "We believe that the matter in neutron stars is denser than an atomic nucleus, but it is unclear by how much," he said. "Our observations of such a rapidly rotating star set a hard upper limit on its size, and hence on how dense the star can be." Hessels and his colleagues presented their findings to the American Astronomical Society's meeting in Washington, DC.

Pulsars are spinning neutron stars (what remains when a huge star explodes as a supernova before dying) that sling "lighthouse beams" of radio waves or light out as they spin. Their material is compressed to densities so extreme that a teaspoon of neutron star matter is thought to weigh billions of tons. British radio astronomers discovered pulsars in 1967, a breakthrough that earned one of them the Nobel Prize. But the method by which pulsars produce their powerful beams of electromagnetic radiation has remained a mystery.

The scientists discovered the pulsar, named PSR J1748-2446ad, in a cluster of stars called Terzan 5, located some 28,000 light-years from Earth in the constellation Sagittarius. The newly discovered pulsar is spinning 716 times per second, or 716 Hertz (Hz), readily beating the previous record of 642 Hz from a pulsar discovered in 1982.

Source: McGill University

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