Binary star system found by following gamma-ray signal

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(PhysOrg.com) -- To find a binary star system, which is where two stars are in close proximity to one another, astronomers have traditionally relied on pure luck. They'd first start studying what would look like a single star, then look for a radiation signal that would provide them with more information. Such a system clearly isn't the best approach to finding such binaries, so a group of researchers have turned the tables around so to speak, as they describe in their paper published in *Science*, and have found a binary by first finding its gamma-ray signal and then tracing it back to its origin.

Because only a few photons emitted from a binary star system are able to make their way to our planet, what we are able to see is quite limited. Because of this, very few binary star systems have been found. To get around this problem, the researchers turned to the Large Area Telescope that is part of the Fermi Gamma-ray Space Telescope. Rather than being aimed at specific points in the sky, it scans whole swaths over periods of several hours. In so doing it of course, comes across all sorts of signals. The team studied the signals that were found during one such scan and then picked out some likely candidates, then traced the signals back to their origin. One such trace revealed, for the first time, a binary star system that had been found by a systematic approach: 1FGL J1018.6-5856.

What scientists know so far is that binary star systems come in two varieties; those that are microquasars, and those that are described as pulsating.

Microquasars are believed to come about due to black holes pulling another star closer, creating fast jets at the top and bottom. The other, a pulsating system comes about, it is thought, when at least one of the stars in the system is a pulsating neutron star. In such a system, the two stars circle each other.

The new binary discovered in the study is believed to be of the second type and emits a huge amount of gamma-rays (electromagnetic radiation of very high frequency) and lesser amounts of x-ray emissions, though the team believes that as the spin of the two stars slows, the relative amounts of radiation emitted by each will likely switch. The researchers also believe the pulsating nature of the star system was hidden by solar winds, which is why it wasn't spotted until now.

Based on their results, the team is optimistic that the same approach they've used can be used to find other binary systems, which would add immeasurably to the body of science surrounding such systems.

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