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The multi-wavelength behaviour of the gamma-ray binary PSR B1259-63/LS 2883 around the 2024 periastron passage

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Gamma-ray binaries are a rare class of high-mass binary systems that produce non-thermal emission peaking in the gamma-ray regime (in a νF_ν distribution). The system PSR B1259–63/LS 2883 consists of a young pulsar in a 3.4-year orbit around an O9.5 Ve star. It was the first binary system discovered to host a pulsar orbiting a non-degenerate companion. The pulsed radio emission is eclipsed from approximately 17 days before until 17 days after periastron, interpreted as the pulsar crossing through the plane of the circumstellar disc surrounding the Oe star. The unpulsed radio and X-ray light curves display two maxima near these same orbital phases. In contrast, at GeV energies, the source exhibits rapid, luminous flares 30–80 days after periastron, exceeding the pulsar's spin-down luminosity. We present an overview of our long-term multiwavelength observation campaign of this system, including results from the most recent periastron passage in 2024, which was characterized by an earlier increase in X-ray (pre-periastron) and GeV (post-periastron) emission. This behavior can be explained by a larger decretion disc, as supported by optical observations.

Author: VAN SOELEN, Brian

Co-authors: KUZIN, Aleksei; FIN GALLAGHER, Aoeife; BUCKLEY, David; MALYSHEV, Denys; MONAGENG, Itumeleng (UCT/SAAO); SHEVLAKOVA, Iullia; Prof. CHERNYAKOVA, Maria (Dublin City University); MATCHETT, Natalie

Presenter: VAN SOELEN, Brian

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