

TeV J2032+4130 and PSR J2032+4127/ MT91 213 - An Unidentified TeV Source and 50 Year Period Binary

The Cygnus region is the brightest region of diffuse gamma-ray emission in the northern sky; rich in both potential sources of cosmic rays (including supernova remnants, pulsar wind nebulae and X-ray binaries) and interstellar gas, it provides a promising area to probe the origins and interactions of cosmic rays. Observations of this region by very high energy gamma ray observatories have detected a number of sources, including the unidentified, extended source TeV J2032+4130. Discovery of the gamma-ray pulsar PSR J2032+4127 in the same direction as TeV J2032+4130 has suggested that the two objects may be linked, with TeV J2032+4130 being the pulsar wind nebula of PSR J2032+4127.

The discovery that PSR J2032+4127 is in a 45-50 year period, highly eccentric binary orbit with the Be star MT91 213 has added new interest to this system. Periastron occurred in November 2017 and over this period an intense observational campaign was conducted by the TeV gamma-ray telescope arrays VERITAS and MAGIC, and the Swift X-ray telescope. These observations detected a significant enhancement in the X-ray and TeV gamma-ray flux, with the emission reaching an order of magnitude higher than the historical level in both wavebands. I will present results of these campaigns, discussing what we have learnt about these objects, comparing them with similar systems and exploring the relationship between PSR J2032+4127/ MT91 213 and TeV J2032+4130.