

Deriving Pulsar Properties from Pulsar Wind Nebulae Using Gamma-Ray And Radio Data

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A significant fraction of the highest energy gamma-ray astrophysical sources observed are associated with Pulsar Wind Nebulae (PWNe). Given recent observations, the postulated, but unverified, hadronic component from PWNe requires renewed attention. We estimate possible ranges for the average pulsar pair production multiplicity on 29 sources in the Australia Telescope National Facility (ATNF) catalogue. We then use the latest gamma-ray data from H.E.S.S. and LHAASO in combination with radio data available in the literature to further constrain associated pulsar properties for a set of well-known PWNe. These include lower limits for the pulsar birth period and average pair production multiplicity. Based on these, for all but one source, we cannot exclude the presence of hadrons in the PWN.

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