

Constraining the Average Pair Physics of Pulsars Embedded in Terzan 5 through Multi-component Spectral Modelling

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Our Galaxy hosts around 160 globular clusters (GCs). The Fermi Large Area Telescope (LAT) has detected about two dozen of them in the GeV band, including Terzan 5. However, only Terzan 5 has plausibly been detected in the very-high-energy range. This unique cluster has also been detected in the radio and X-ray bands. We model the updated broadband spectral energy distribution, attributing this to cumulative pulsed emission from a population of embedded millisecond pulsars, as well as to unpulsed emission resulting from the interaction of the escaping pulsar leptonic winds with the ambient magnetic and soft-photon fields. Using both pulsed and unpulsed spectral components to consistently fit the available data yields strong constraints on the average spatial distribution of currents within the pulsar magnetospheres. We show that a good fit requires increased pair production for particles emitting keV and GeV emission, with a lower multiplicity required to fit the unpulsed components.

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