

Stacked Analysis of Galactic Wolf-Rayet Stars

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Wolf-Rayet (WR) stars are massive evolved stars undergoing advanced nuclear burning in their cores and possess strong stellar winds. WR stars – and in particular WR binary systems – are also predicted to be potential emitters of gamma rays. Although details of the high-energy emission mechanisms are not well-understood, a majority of the emission is likely due to strong shocks produced by the colliding winds of WR binary systems. The shocked winds accelerate cosmic rays via diffusive shock acceleration, which subsequently produce X rays and gamma rays through inverse Compton processes, as well as producing neutral pions that quickly decay into gamma-ray photons. To date, only one WR system (WR11) has been detected in both X rays and gamma rays, and typically the WR gamma-ray emission is expected to be below the detection threshold of the Fermi-LAT. We conduct the first comprehensive analysis of the entire population of Galactic WR stars, including both isolated and binary systems. Since the gamma-ray emission from any one of these systems is expected to be faint, we employ a stacking technique. In this talk I will detail the motivation for our analysis, outline the analysis procedure, and present preliminary results.

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