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The Spectrum, Morphology and Luminosity of Galactic Gamma-Ray Pulsars

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Gamma-Ray observations by the Fermi-LAT have uncovered a substantial population of gamma-ray bright pulsars in our galaxy. Using 5.5 years of Fermi data, we measure the spectrum and morphology of both the young and recycled pulsars, and show current data allows for a direct measurement of the gamma-ray luminosity function of the pulsar population. We apply the results of our analysis to the population of observed globular clusters, which are expected to be gamma-ray bright due to their significant pulsar population, and produce strong constraints on the gamma-ray emission which could be produced by a hidden population of under-luminous pulsars. Finally, we show that a population of millisecond pulsars is unable to provide the required intensity and spectral signature necessary to explain the observed emission.

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