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The Effect of Different Magnetospheric Structures on Predictions of Gamma-ray Pulsar Light Curves

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Abstract content
   (Max 300 words)

The second pulsar catalogue of the Fermi Large Area Telescope (LAT) will contain in excess of 100 gamma-ray pulsars. The light curves (LCs) of these pulsars exhibit a variety of shapes, and also different relative phase lags with respect to their radio pulses, hinting at distinct underlying magnetospheric geometries and emission properties for the individual pulsars. Detailed geometric modelling of the radio and gamma-ray LCs may provide constraints on the B-field structure and emission geometry. We used different B-field solutions in conjunction with an existing geometric modelling code, including the static vacuum dipole, the retarded vacuum dipole, and offset-dipole solutions, and constructed radiation sky maps and LCs for several different pulsar parameters. Standard emission geometries were assumed, namely the Two-Pole Caustic (TPC) and Outer Gap (OG) models. The sky maps and LCs of the various B-field and radiation model combinations were compared to study their effect on the resulting LCs. As an application, we compared our model LCs with Fermi LAT data for the Vela pulsar, and inferred the most probable configuration in this case, thereby constraining Vela's high-altitude magnetic structure and system geometry.

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