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Pulsar striped wind emission: a multi-wavelength and population synthesis perspective

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Since the launch of the Fermi/LAT telescope in June 2008, several hundred radio-loud gamma-ray pulsars have been detected. Observing simultaneously their radio and gamma-ray pulse profiles helps to constrain the geometry and radiation mechanisms within their magnetosphere and to localize the photon production sites. In this talk I show how time-aligned gamma-ray light curve fitting of young pulsars reveals their geometry, namely the magnetic axis and line-of-sight inclination angles. To this end, I assume a dipole force-free magnetosphere where radio photons emanate from high altitudes above the polar caps and gamma-rays originate from the pulsar striped wind, close to the light-cylinder. The striped wind emission model agrees well with the time-aligned single- or double-peaked gamma-ray pulses. Moreover the distinction between radio-loud, radio-quiet gamma-ray pulsars and radio-only pulsars is entirely related to the geometry of the associated emitting regions. The high-altitude polar cap model combined with the striped wind represents a minimalistic approach able to reproduce a wealth of gamma-ray pulse profiles for the whole young pulsar population.

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