

Acceleration and high-energy emission in the polar cap and slot gap

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ABSTRACT: Thirty-five years after the discovery of rotation-powered pulsars, we still do not understand their pulsed emission at any wavelength. In the last few years there have been some fundamental developments in acceleration and emission models. I will review both the basic physics of the models as well as the latest developments in understanding the high-energy emission of rotation-powered pulsars, with particular emphasis on the polar cap and slot gap models. Special and general relativistic effects play important roles in pulsar emission, from inertial frame-dragging near the stellar surface to aberration, time-of-flight and retardation of the magnetic field near the light cylinder. Understanding how these effects determine what we observe at different wavelengths is critical to unraveling the emission physics. I will discuss how current and future X-ray and gamma-ray detectors can test the predictions of these models.