The Structure and Signals of Neutron Stars, from Birth to Death



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## Constraint of Pulsar Wind Properties from Induced Compton Scattering off Radio Pulses

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Pulsar winds have problems in energy conversion and pair-cascade processes which determine the magnetization, the pair multiplicity and the bulk Lorentz factor of the wind.

We study induced Compton scattering by a relativistically moving cold plasma to constrain wind properties by imposing that radio pulses from the pulsar itself are not scattered by the wind as was first studied by Wilson & Rees.

We find that relativistic effects cause a significant increase or decrease of the scattering coefficient depending on scattering geometry.

Applying the Crab pulsar wind, we obtain the lower limit of the bulk Lorentz factor of ~ 10 at the light cylinder when the wind velocity is significantly inclined with respect to the radio pulses.

Considering the lower limit of the pair multiplicity 10<sup>6</sup>.6 suggested by recent studies of the Crab Nebula, the large inclination angle of the wind velocity (order unity), the small size of radio pulse emission region ( $^{10^{3}}$  cm) and the small magnetization parameter (order unity) are required for the pair multiplicity > 10<sup>6</sup>.6.

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