

Force-free magnetosphere of an aligned rotator

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ABSTRACT: I discuss properties of a force-free pulsar magnetosphere and address the role of electron-positron cascades in determining a particular configuration among other possible force-free magnetospheric configurations. I report on results of high resolution numerical simulations of the force-free magnetosphere of aligned rotator and analyze in details properties of aligned pulsar. Models of aligned rotator magnetosphere with widely accepted configuration of magnetic field, when the last closed field line lies in equatorial plane at large distances from pulsar, have serious difficulties. I discuss solutions of this problem and argue that in any case, also for inclined pulsar, energy losses should evolve with time differently than it is predicted by the magneto-dipolar formula. So, the pulsar breaking index should be different from the "canonical" value equal to 3.