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Key role of circumpulsar planet formation in understanding cosmic-ray positron measurements

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Abstract

The first extrasolar planetary system was observed around a pulsar. Young pulsar spin-down might be partly due to friction or propeller torque from supernova-fallback disks, considered responsible for planet formation. In addition, we suggest that e^+e^- pairs produced in the pulsar magnetosphere interact in the disk material. Unique signatures are expected in the cosmic-ray e^+/(e^++e^-) measurements. Consequently, it will be possible to set upper limits on pulsar electromagnetic and other energy loss mechanisms. We point out that precious clues on pulsar physics can only be obtained from the comparison of measurements and theoretical speculations developed in very different fields of Astronomy and Astrophysics.