

Abstract Submitted
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Pulsar kicks with electrons in Landau levels and active, sterile neutrinos LEONARD KISSLINGER, Carnegie Mellon University — Very large velocities of pulsars have been observed: called pulsar kicks. The electrons produced with the anti-neutrinos during the first about 50 seconds of the supernova event are in Landau levels due to the strong magnetic field. This leads to asymmetry in the neutrino momentum. We derive the momentum given the proto-neutron star during the time when the neutrino sphere is near the surface of the proto-neutron star and find that highly luminescent neutron stars could receive a velocity of more than 1000 km/s, as has been observed[1]. During the first 10 seconds, when most of the energy emitted by neutrinos occurs, only neutrinos at the edge of the neutrino sphere are emitted, and little asymmetric momentum is produced unless the neutrinos oscillate to sterile neutrinos. We use a model with two sterile neutrinos obtained by fits to the MiniBoone and LSND experiments, and show that large pulsar kicks can be obtained [2]

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[2] L.S Kisslinger, E.M. Henley, M.B Johnson, astro-ph/0712.0197

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