CHIRAL ASYMMETRY IN MAGNETIZED DENSE RELATIVISTIC MATTER AND PULSAR KICKS

E.V. Gorbar[1,2]

[1]Faculty of Physics,
Taras Shevchenko National Kiev University
(*2, Prosp. Academician Glushkov, Kyiv 03022, Ukraine*),
[2]Bogolyubov Institute for Theoretical Physics,
Nat. Acad. of Sci. of Ukraine
(*14b, Metrolohichna Str., Kyiv 03680, Ukraine;*
e-mail: gorbar@bitp.kiev.ua)

S u m m a r y

The weak interactions of neutrinos with charged fermions in a magnetized dense relativistic matter are shown to generate a non-zero chiral shift parameter for neutrinos that produces their asymmetric distribution in the momentum space in the equilibrium state. It is found that this asymmetry is too small in order to explain the largest pulsar velocities observed. The hot-spot scenario involving the topological current or some other mechanism of the hot spot formation is suggested, and it is argued that this scenario can provide the necessary large pulsar kicks.