

Spin Light of Neutrino in Gamma-Ray Bursts

Friday, July 6, 2018 8:15 PM (15 minutes)

The spin light of neutrino (SL ν) [1] is the electromagnetic radiation emitted by a neutrino due to its magnetic moment when the particle is moving in external environments, i.e. in the presence of matter and/or electromagnetic or gravitational fields [1-3]. Within the developed quantum theory of SL ν in matter [4-6] it has been shown that the efficiency of this radiation increases with increase in both the neutrino energy and the density of matter through which the neutrino is propagating. Therefore, the most suitable astrophysical conditions for this phenomenon to be manifested in are realized in Gamma-Ray Bursts (GRB) where generation of ultra-high energy neutrinos is anticipated and the matter density can reach values on the order of the nuclear density [7]. In the present work we discuss the possibility of the SL ν radiation in GRBs during their prompt stage. We search for conditions of the best radiation efficiency within the GRB site and describe the most important radiation characteristics such as the total rate and power, the angular distribution and polarization. On this basis we analyze the possibility to find the imprint of the SL ν in the observed gamma-ray flux.

Primary authors: GRIGORIEV, Alexander (MSU); LOKHOV, Alexey (MSU); STUDENIKIN, Alexander; MERTENOV, Alexei (MIPT)

Presenter: LOKHOV, Alexey (MSU)

Session Classification: POSTER

Track Classification: Neutrino Physics