

The electroweak phase transition in a spontaneously magnetized vacuum

Wednesday, 5 December 2018 16:20 (20 minutes)

We investigate the electroweak phase transition in the Standard Models with accounting for the spontaneous vacuum magnetization. It is known that for the mass of Higgs boson greater than 75 GeV, the electroweak phase transition is second order. But according to Sakharov's conditions for the formation of the baryon asymmetry of the Universe, it should be strong first order. The spontaneously generated fields are temperature dependent and they have an influence on the phase transition.

Chromomagnetic fields B_3 and B_8 have to be created spontaneously in the gluon sector of QCD at temperature $T > T_d$ higher the deconfinement temperature T_d . Usual magnetic field H should also be spontaneously generated because of quark-loop. For T near T_{EW} , this field should be present too, so they can change the behavior of phase transition.

The critical temperature for the electroweak phase transition is estimated in Standard model and in the scalar theory. The field strengths $B_3(T)$, $B_8(T)$ and $H(T)$ at relevant temperatures are also estimated.

Primary authors: Prof. SKALOZUB, Vladimir (Oles Honchar Dnipro National University); MINAIEV, Pavlo (Oles Honchar Dnipro National University)

Presenter: MINAIEV, Pavlo (Oles Honchar Dnipro National University)

Session Classification: Physics of Nuclei and Elementary Particles

Track Classification: Physics of Nuclei and Elementary Particles