



PHYSICS AND ASTRONOMY SEMINAR

Dr. Jonathan Kozaczuk

TRIUMF

“Cosmological Phase Transitions and their Properties in the NMSSM”

Abstract

Electroweak baryogenesis has long been an attractive possibility in the context of supersymmetry. In the minimal supersymmetric Standard Model (MSSM), electroweak baryogenesis requires light scalar top quarks to strengthen the electroweak phase transition. However, light stops have not been observed at the LHC so far. It is thus important to consider to what extent electroweak baryogenesis can be realized in supersymmetric models beyond the MSSM, given current experimental results. In this talk, I will discuss recent work studying cosmological phase transitions in the Next-to-Minimal Supersymmetric Standard Model (NMSSM) in light of the Higgs discovery and with heavy stops. The phase transition structure in viable regions of parameter space exhibits a rich phenomenology, potentially giving rise to one- or two-step first order phase transitions. I will also discuss results for several parameters relevant for calculating the baryon asymmetry in the context of electroweak baryogenesis. Our study suggests that successful electroweak baryogenesis may indeed occur in regions of the NMSSM compatible with the Higgs discovery and the absence of low-energy supersymmetry observed thus far at the LHC.

Friday, December 5, 2014

2:00 p.m.

Elliott Building

Room 161