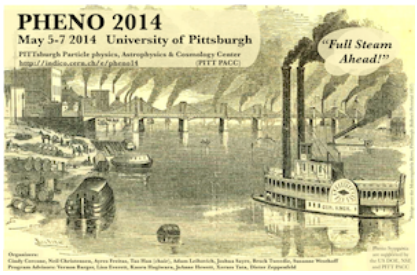

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Heavy Gravitino and Split SUSY in the Light of BICEP2

Monday 5 May 2014 15:00 (15 minutes)

High-scale supersymmetry (SUSY) with a split spectrum has become increasingly interesting given the current experimental results. A SUSY scale above the weak scale could be naturally associated with a heavy unstable gravitino, whose decays populate the dark matter (DM) particles. In the mini-split scenario with gravitino at about the PeV scale and the lightest TeV scale neutralino being (a component of) DM, the requirement that the DM relic abundance resulting from gravitino decays does not overclose the Universe and satisfies the indirect detection constraints demand the reheating temperature to be below 10^9-10^{10} GeV. On the other hand, the BICEP2 result prefers a heavy inflaton with mass at around 10^{13} GeV and a reheating temperature at or above 10^9 GeV with some general assumptions. The mild tension could be alleviated if SUSY scale is even higher with the gravitino mass above the PeV scale. Intriguingly, in no-scale supergravity, gravitinos could be very heavy at about 10^{13} GeV, the inflaton mass scale, while gauginos could still be light at the TeV scale.

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