

Search For Boosted Light Higgs Bosons From Supersymmetric Cascade Decays

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Although there is no concrete evidence of physics beyond the Standard Model at the LHC, there is still a great deal of potential to be explored. Taking advantage of the upgraded detectors and the higher integrated luminosity expected in future runs is critical for uncovering novel phenomena at the LHC.

Our research is looking for pairs of light Higgs bosons (H_1) through SUSY cascade decays of pair-produced squarks (\tilde{q}) and gluinos (\tilde{g}). These events have small missing transverse momentum (p_T) in the final state, as a result of the mass spectrum between the singlino-like particle in the Next-to-Minimal-Supersymmetric Standard Model (NMSSM) and the Higgs. This leads to cascade decays via the next-to-Lightest SUSY Particle (LSP), $\tilde{\chi}_2^0$, to a singlino-like LSP, $\tilde{\chi}_1^0$, and a CP-even singlet-like Higgs boson H_1 . This research is based on previously published analysis for Run 2 data.

In the published analysis, H_T binning was used. However, for Run 3, we are planning to use Squark mass binning to make the analysis more precise. I will discuss in detail, why Squark mass reconstruction is important and outline the best methods to achieve it.

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