

Thesis outline

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Introduction

- Standard LHC schpiel, prospects for BSM
 - Brief: importance of SUSY, currently mostly unconstrained
 - Need both experimental probing and interpretation
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Theory

- SM: Brief intro, predictive power (EWPOs), problems (H: w-scattering), hierarchy problem
 - BSM: Motivate via problems with SM - i.e. what BSM needs to provide
 - SUSY: Basic introduction to construction
 - SUSY:
 - motivate R parity via proton
 - RP implies stable neutralino
 - Stable neutralino is CDM candidate
 - Motivate low mass neutralino
 - low mass neutralino implies MET
 - Minimal SUSY:
 - MSSM introduction: how to we minimally get what we want from SUSY framework
 - Models of SUSY: each gets rough theory treatment, and pheno: what differentiates it, why look for it, what is the “dead end” if any
 - Universal and 2 scale models: cMSSM, vcMSSM, mSUGRA
 - Non-universal models: NUHM{1,2}
 - pMSSM
 - OSET -> SMS
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Exploring SUSY models

- Making use of MET signatures: α_T
 - description
 - QCD background parameterization
 - Signal model examples
 - Likelihood model (b-jet multiplicities)
 - ... (this section needs some discussion/input on areas to be covered)
 - Results: presented in cMSSM and SMS with scaling (i.e. each of the three results so far)
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Constraining models of SUSY

- Existing constraints:
 - EWPOs , bphysics, dark matter, lep higgs
 - Current state of models
 - LHC-era constraints:
 - MET, Bsmumu, Xenon
 - Effect of direct searches, progressive (37pb->5fb)
 - State of play (best fit particle spectra, etc.)
 - Most sensitive now to...
 - Universal / Two scale model prospects
 - Reach of LHC (neutralino mass -> MET, production mech: glu, squ)
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Future prospects for SUSY / BSM

- cMSSM / two scales: mostly flat, NUHM2 only real “predictive”
 - Might not be something universal / RGE motivated:
 - pMSSM
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Conclusion