Analyses by final state signatures

Proposal for (B)SM working group

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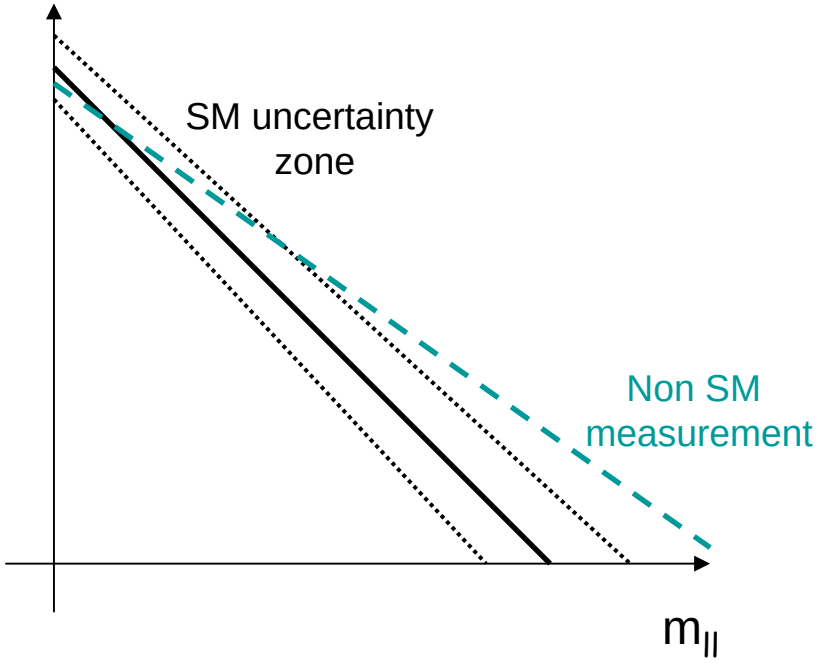
Introduction

- Motivation:
  - Understand the SM predictions and establish their uncertainty band
  - Every prediction outside this band is a signature of new physics
- 1st year of LHC:
  - Simple topologies and robust analyses:
    - Di-leptons, di-photons, dijets…

2 sides: Limits of the SM and possible BSM signatures

SM



BSM →

	Observable 1	Observable 2	
Class1: Z' models	Spin study	A_{fb}	
Class2: model X: G → ll	Spin study		...
Class3: SUSY: model Y			
…			

Standard Model side: *Predictions*

- Question: What is the SM prediction on (*simple topology,observable*), ex (dilepton, Pt) ?

  → *what will we measure when we ask for this topology,Pt ?*
- Theoretical side:
  - simple final state topology (2e, 2y, 2jets…)
  - observables (may be by interacting with BSM)
  - list and estimate sources of uncertainties (PDF, NLO, μ_{fact}, μ_{renor}…)
  - ***GOAL: Make the SM uncertainty zone***
- Experimental side: Experiment dependant
  - Experimental considerations: (reco, energy scale,…)
  - Mis-Identification: ZZ or WW like DY…*(composition of the measured sample with given set of cut)*
- ***Establish the shape and the composition of measured sample and its uncertainty band***

Beyond Standard Model side

- For a given (simple topology,observable):
  - Report of all the existing models in the market
  - Other observables to desintangle between models and priority between them
  - ….

First topologies

- Dileptons:
  - SM: $M_{\ell\ell}$, boost, $\Delta\eta$, θ^*, $\Delta\phi$

    .PDF,μ_{fact},μ_{ren}

    .WW, tt, tt, ECal linearity, charge mis-id, W+jet
  - S-channel resonances

    Z',G*,Z_H,Z_{KK}
  - Leptoquarks and Leptogluons
  - Heavy scalars

    Graviscalar, radion, heavy higgs
- Diphotons:
  - SM: using DiPhox

    .PDF,μ_{fact},μ_{ren},μ_{frag}, isolation

    .2-jets, γ+jet, ECal linearity,
  - S-channel resonances

    .G*
  - Virtual Excited quarks
  - Heavy scalars
  - Non commutative geometry:

    .Triphoton coupling

Volonteers and topologies

- BSM side:
  - J. Lykken,D. Choudhury,R. Godbole,…
- SM side:
  - C. Buttar,…
  - Drell Yan like:
    - Uncertainties in Z production: E. Busato, S.Ferrag..
    - Di-muon studies: S. Hassani,…
  - Other topologies: di-photons, dijets, Z, W,…

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Extra-dimensions

- People interested in this topic are invited to show up
- H. Przysiezniak, D. Goudjami: specific pbs
- Generators