

# Proposed Benchmark Models

P. Harrison, JLH, Y. Okada

Supersymmetry - obtain mass spectrum from  
Snowmass Points + Slopes

3+ 1) mSUGRA

-  $SU(5) + \gamma_R$

0 2) GMSB

1 3) Effective SUSY (light sthird generation)

5 4) CP  $\tilde{q}$  mass insertions

CP Higgs Sector

2 5) CP General 2HDM

Choose one...

~~CP Within MSSM~~

1 6) Extra Dimensions -

TeV<sup>-1</sup> with split fermions

- We will pick <sup>reasonable</sup> values of model parameters

★ Make good use of machinery already in place!

## Expected sensitivity in B sector

-small

-0

big

big

potentially  
big

huge

## Three Ingredients to $10^{36}$ Study

### ★ 1) Level of Experimental Precision

- New analysis techniques

### ★ 2) Expected Theoretical Precision

### 3) Implications of New Physics

- Mass scale reach no longer relevant  
measure of performance
- Distinguish between models (e.g. SUSY)
- Measure New flavor violation + CP parameters

Can't address #3 until #1 + 2 are determined

- 1<sup>ST</sup> task of working groups!
- Focus on observables where  $e^+e^-$  offers  
unique opportunities / precision

① Left-Right Model

~~② FCZ~~

~~③  $X_p$~~

④ Little Higgs

~~⑤  $\tilde{q}-q$  alignment~~

⑥ Topcolor

To make the physics case we must:

- 1) Compare to  $1-5 \times 10^{35} \text{ cm}^{-2} \text{ s}^{-1}$
- 2) Demonstrate unique capabilities of  $e^+e^-$  vs. hadron machines
- 3) Demonstrate relevance in era when ATLAS/CMS
  - are producing New Physics directly
  - have no New Physics signals
- 4) Compare EDM
- 5) Compare CKM

Community will demand answers to these issues + we must be prepared!

## Steps to study Physics Beyond the SM

- Establish set of Benchmark New Physics Scenarios

### Within a particular scenario:

- Calculate  $B$  Physics observables (within each W.G.)
  - ★ Feed in input from LHC ★
- Simulate observables
- Determine if model can be distinguished
  - within the exp't + theoretical precision
- Determine if flavor parameters can be measured

This procedure is robust, but perhaps not practical!

⇒ Suggest full study for 1 Benchmark model

Phenomenological analysis for the rest....