

# BSM Tools – Session 1

- Welcome & Introduction
- Need for X-dim Tools (A. de Roeck)
- Discussion

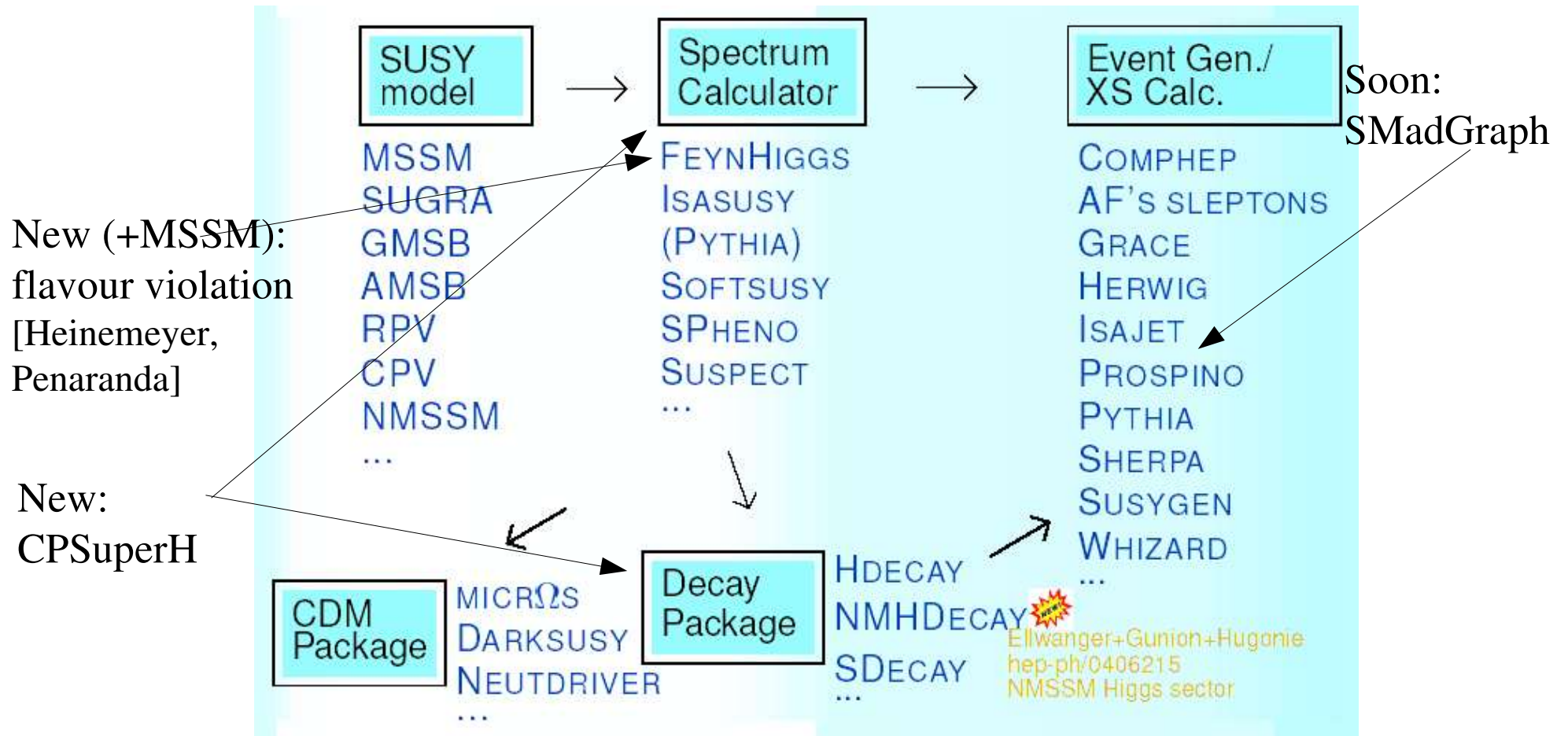
Contact: Peter Skands ([skands@fnal.gov](mailto:skands@fnal.gov))

# BSM Model Building

- SUSY ((N)MSSM, SSB, CPV, RPV, split, ...)
- Extra Dimensions (small, large, universal, BH, ...)
- Little Higgs / Technicolor / Higgsless
- Extended gauge/higgs/... sectors, compositeness
- General BSM? / Other BSM

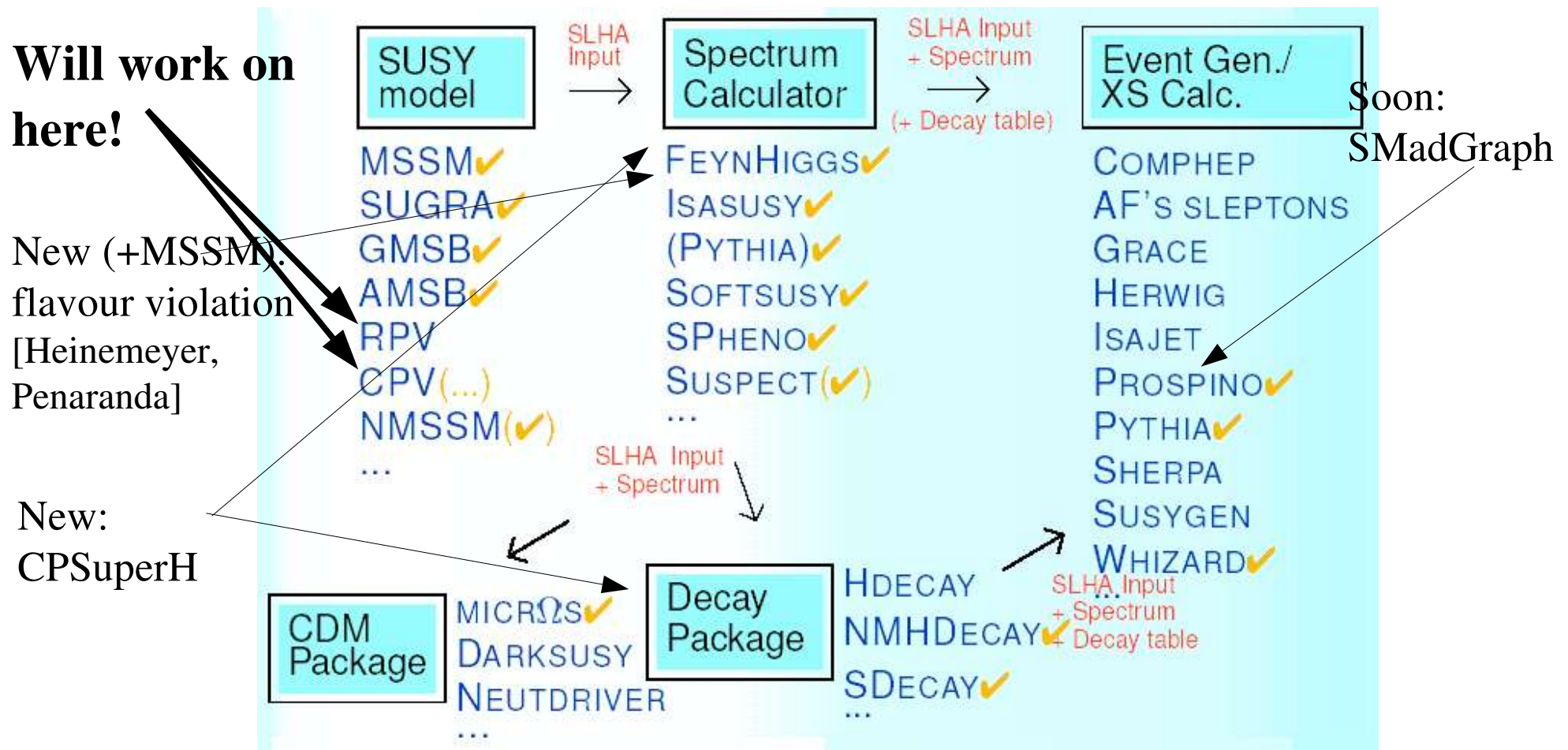
# BSM Tools

- SUSY: *many* tools -> need to unify -> last Les Houches: the SUSY Les Houches Accord.



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# (B)SM Event Generators

Kind	Process	PYT	HER	ISA	Now: + SHP
QCD & related	Soft QCD	*	*	*	
	Hard QCD	*	*	*	
	Heavy flavour	*	*	*	
Electroweak SM	Single $\gamma^*/Z^0/W^\pm$	*	*	*	
	$(\gamma/\gamma^*/Z^0/W^\pm/f/g)^2$	*	*	*	
	Light SM Higgs	*	*	*	
	Heavy SM Higgs	*	*	*	
SUSY BSM	$h^0/H^0/A^0/H^\pm$	*	*	*	
	SUSY	*	*	*	
	R SUSY	*	*	—	
Other BSM	Technicolor	*	—	(*)	
	New gauge bosons	*	—	—	
	Compositeness	*	—	—	
	Leptoquarks	*	—	—	
	$H^{\pm\pm}$ (from LR-sym.)	*	—	—	
	Extra dimensions	(*)	(*)	(*)	

# Extra Dimensions

- Disclaimer: I am not fully up-to-date!
- More in de Roeck's talk, but roughly:
  - PYTHIA: Randall-Sundrum graviton excitations.
  - CHARYBDIS: Black Holes
  - HERWIG – I'm not sure...
  - SHERPA: ADD graviton excitations.
  - + do-it-yourself solutions
- I do not have a good overview of available codes.  
Does anyone? Should this be a task?

# Other BSM

- Extra fermions (eg heavy top, T) usually done by using existing 4<sup>th</sup> generation fermion implementations (e.g. in PYTHIA). Need more?
- Extra gauge bosons. Much also can be done using existing implementations. Need more?
- Extended Higgs and other sectors. Some can be done (eg H<sup>++</sup>), but no general tools available.
- Bug-eyed physics: what can we / do we need / do we want to do for most general BSM for LHC?

# Topics (working list...)

- General: private codes -> public. Need to create overview of available tools -> put it in LH summary and on the web.
- Tools for Extra Dimensions (cf de Rooek)
  - Discussion session.
- Extending the SLHA: including CPV, RPV, ...
- Tools for other (well-defined) BSM physics
  - Discussion session: needs for LHC. Initiatives.
- Tools for bug-eyed BSM physics?
  - Discussion session: (Joe Lykken?)