TeV4LHC Landscape

Working Group Summary

David Rainwater

Oct. 22, 2005

- Summary of talks
- Plans for the Report

WHO AND WHAT WE ARE

Convenors:

Volker Büscher	(Freiburg, buescher@fnal.gov)
Bogdan Dobrescu	(Fermilab, bdob@fnal.gov)
David Rainwater	(Rochester, rain@pas.rochester.edu)
Michael Schmitt	(Northwestern, schmittm@lotus.phys.northwestern.edu

Questions to address:

1. How do the solutions to analysis problems for searches at the Tevatron generalize to the LHC?
2. How will measurements and searches at the Tevatron impact theoretical predictions for the LHC?

REVIEW OF THIS MEETING'S TALKS

Asai: SM bkg to SUSY much larger than believed - W/Z+jets: study these SM processes at Tevatron, learn to model.

Heldmann: Use DØ data & sim. to develop ATLAS τ ID algorithms.

Gershtein: updates on electron & photon ID & isolation.

Lin: $B_s \to \mu^+\mu^-$ @ Tev2 and constraints on SUSY; use Tev2 to study $B \to hh$ as potentially serious background at LHC.

Kong, Group: Distinguishing SUSY & UED, virt. slepton M @ LHC - evolution in studies of particle kinematics in cascade decays.

Macesanu: Pheno of single-KK production in UED.

Milstead: R-hadrons (e.g. stable hadronized gluinos)
- phenomenon of charge-flipping (nuclear interactions)
- serious tracking issues of ability to ID
- can tracking algorithm study at Tevatron help LHC?

REVIEW OF THE YEAR'S TALKS 1/4

- **Experimental - overview:**

LHC detector & trigger staging as a result of Run II	Spiropolu
Multi-lepton & tau signatures	Büscher
Signatures for new physics from jets & $\not{E}_T$	Wang
Photon-based signatures from GMSB & extra-dim.	Gershtein
SUSY @ LHC - how can Tevatron help?	Polesello

- **Experimental - searches: (excluding Higgs)**

Leptoquarks @ Tevatron & LHC	Rolli
$B_s \longrightarrow \mu^+\mu^-$ @ Tevatron	Lin

- **Experimental - post-discovery pheno:**

Disentangling SUSY signatures @ LHC	Kehoe
Distinguishing Z-primes in ATLAS	Trocme

- **Experimental - miscellaneous:**

Need for extra-dim. event generators	de Roeck
SFITTER	D. Zerwas

REVIEW OF THE YEAR'S TALKS 2/4

- Experimental - hardcore TeV4LHC:

Heavy flavor tags for stop & sbottom @ Tev2 & LHC	Bortoletto
Advanced e^- reconstruction with DØ data	Gershtein
Tau ID in ATLAS DØ	Heldmann
Same-sign dimuons from SUSY @ CMS	Drozdetskiy
V+jets backgrounds to SUSY searches	Asai
Tau ID, DØ $\longrightarrow$ ATLAS	Heldmann
SM bkg to SUSY from $\not\!\!E_T$ & matrix elements	Asai
Disting. betw. long-lived heavy charged particles	Milstead
Z' searches: Tev/LHC synergy	Schmitt

▶ Expect to see major contributions for all except b tags

REVIEW OF THE YEAR'S TALKS 3/4

- Theoretical - model-based pheno:

SUSY benchmarks after Run II	Weiglein
SUSY, dark matter and collider physics	Baer
UED signatures @ Tevatron & LHC	Nandi
Interpreting new physics signatures	Kane
Tev-scale string resonances	Han
Level-2 UED gauge bosons @ LHC	Kong
Rare pseudoscalar Higgs decays	B. Field
Higgsless model phenomenology	Birkedal
T-parity Little Higgs phenomenology	Hubisz
SUSY @ LHC - where Tevatron can help	Kraml
Distinguishing SUSY from UED	Kong

- Theoretical - conventions and tools:

SUSY Les Houches Accord	Skands
EW fits in Higgs triplet models	Chen
Measuring virtual slepton masses @ LHC	Group

REVIEW OF THE YEAR'S TALKS 4/4

- Theoretical - searches & limits:

Stop, chargino and neutralino @ Tev & LHC	Balazs
Limiting technicolor @ Tevatron	Lane
mSUGRA reach @ Tevatron & LHC	Krupovnickas
mSUGRA & its 1-parameter extension, constraints	Belyaev

- Theoretical - generic signatures:

Z-primes @ Tev/LHC	Tait
W-primes @ Tev/LHC	Sullivan
Vectorlike quarks	Tait
Single UED KK production	Macesanu

▶ Plan major contributions for generic signatures

The Working Group Report

100-150 pages total, expect $\sim$5 pages per contribution

THE WORKING GROUP REPORT

100-150 pages total, expect $\sim$5 pages per contribution

Rough breakdown of major sections:

1. Experimental aspects:

   testing & developing LHC algorithms w/ Run II data

2. Model-independent analysis:

   Z/W-primes, vectorlike fermions, leptoquarks, gluinos, string resonances, ...

THE WORKING GROUP REPORT

100-150 pages total, expect $\sim$5 pages per contribution

Rough breakdown of major sections:

1. Experimental aspects:

   testing & developing LHC algorithms w/ Run II data

2. Model-independent analysis:

   Z/W-primes, vectorlike fermions, leptoquarks, gluinos, string resonances, ...

$\longrightarrow$ Other contributions welcome (section on Models?), but please focus on how it fits into the TeV4LHC theme.

▶ Report will emphasize:

- critical areas where Tevatron preps for LHC
- critical areas where Tevatron covers LHC search "holes"

PROJECTS - PRELIMINARY/PARTIAL

- Electrons and photons (Gershtein)
- Muons (Hof, Magass, Drozdetskiy)
- Taus (Heldmann, Torchiani, Büscher)
- Jets (W/Z+jets, etc.) and $\not{E}_T$ (Asai, ...)
- Z-primes (Tait, Schmitt, Dobrescu, Trocme)
- W-primes (Sullivan, Hof, Magass)
- Vectorlike quarks (Tait, Azuelos)
- Leptoquarks (Spira, ...)
- Tev-scale string resonances (Han, Burikham)
- Stable, long-lived heavy charged particles (Milstead)
- Tools, standards, disentanglement (Zerwas, Skands, Kehoe)
- Models [SUSY, UED, ...] (Kraml, Kong, Matchev, ...)

FINAL COMMENTS

- A Report is more useful than a Proceedings:

we encourage people to write topical sections together, rather than just summarize their contributed talk;

the convenors may edit contributions to achieve this.

FINAL COMMENTS

- A Report is more useful than a Proceedings:

we encourage people to write topical sections together, rather than just summarize their contributed talk;

the convenors may edit contributions to achieve this.

The structure will evolve, depending on what we receive.

Additional major sections, reorganizations, etc.

FINAL COMMENTS

- A Report is more useful than a Proceedings:

we encourage people to write topical sections together, rather than just summarize their contributed talk;

the convenors may edit contributions to achieve this.

The structure will evolve, depending on what we receive.

Additional major sections, reorganizations, etc.

Emails on plans & instructions to follow soon -

please add yourself to the Landscape listserv if interested.

FINAL COMMENTS

- A Report is more useful than a Proceedings:

we encourage people to write topical sections together, rather than just summarize their contributed talk;

the convenors may edit contributions to achieve this.

The structure will evolve, depending on what we receive.

Additional major sections, reorganizations, etc.

Emails on plans & instructions to follow soon -

please add yourself to the Landscape listserv if interested.

Thanks to all the organizers and speakers –

but don't relax, the real work has just begun!