



LUND UNIVERSITY

Partikeldagarna 2008
16-17 October 2008
Alba Nova, Stockholm

Lund Phenomenology – Introduction and Overview

Torbjörn Sjöstrand

Theoretical High Energy Physics group

Department of Theoretical Physics

Lund University

To be followed by Christoffer Flensburg
Hendrik Hoeth
Richard Corke

Personnel

Name	position	funding	until
Johan Bijmens	professor	LU/VR	
Leif Lönnblad	professor	LU/VR	
Torbjörn Sjöstrand	professor	LU/VR	
Gösta Gustafson	prof. emeritus	LU/Hamburg	Mar 09
Hendrik Hoeth	postdoc	MCnet (EU)	Oct 09
Lisa Carloni	PhD student	Lund-HEP EST (EU)/LU	Oct 10
Richard Corke	PhD student	Lund-HEP EST (EU)/LU	Oct 10
Christoffer Flensburg	PhD student	LU	Oct 10
Ilaria Jemos	PhD student	FLAVIANet (EU)/LU	Oct 11
Nils Lavesson	PhD student	LU	Feb 09
Jie Lu	PhD student	Lund-HEP EST (EU)/LU	Oct 10

+ MCnet short-term visitors (\sim 10 man-months/year)

+ Lund-HEP EST 6-month visitor(s)

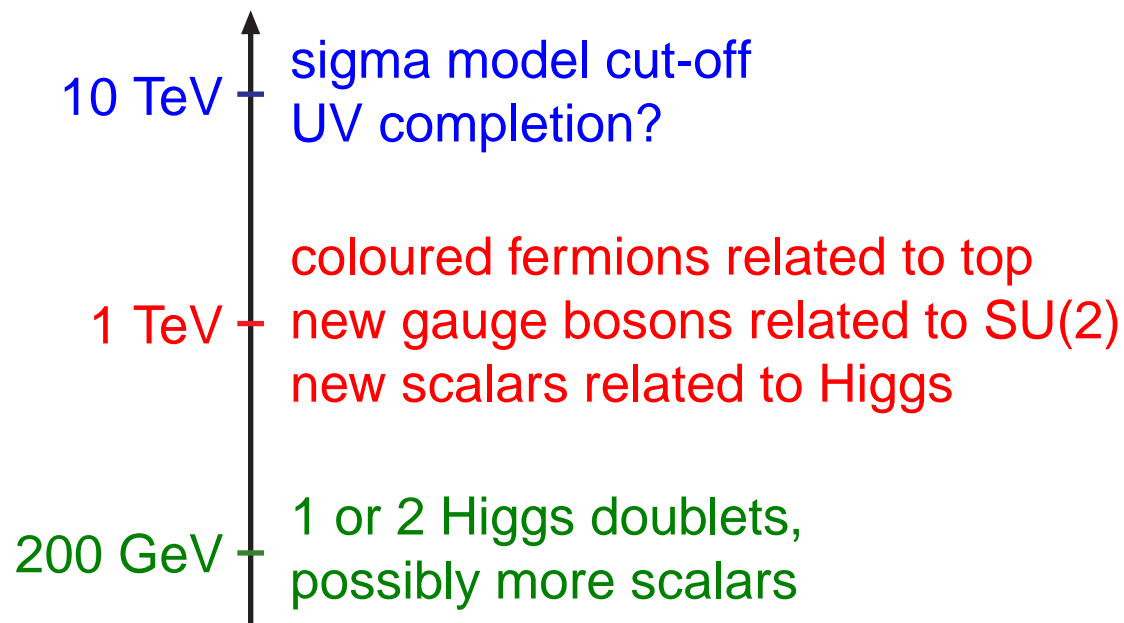
Other News

- Attempt to hire “biträdande lektor” failed; job went to Computational Biology and Biological Physics group.
- Group ranked “outstanding” (highest grade) in recent university-wide RQ08 evaluation, with many nice words.
- Hope to be given new chance to hire “biträdande lektor” next year.
- Intend to advertise postdoc position soon.
- Should advertise new Ph.D. student position soon.
- Further short-term visitors (but MCnet-wide recruitment problem).
- Departments of Theoretical Physics and Astronomy merge 2010.
- Asked to move to Astronomy building.
- May be forcibly joined with Physics Department latest 2013.

Little Higgs model studies

(Lisa Carloni, Lu Jie; Johan Bijnens)

Little Higgs is an effective theory, in which the Higgs is a pseudo-Goldstone boson. The group is working in particular on the Minimal Moose Model.



- Lu Jie studies the longitudinal WW scattering which (through the equivalence theorem) corresponds to Goldstone Boson scattering.
- Lisa studies the Higgs's mixing with scalar fields and consequent hiding of the Higgs.

More next year . . .

Determination of Low Energy Constants (LECs) of Chiral Perturbation Theory (ChPT)

(Ilaria Jemos; Johan Bijnens)

- ChPT is the Effective Field Theory of QCD at low energy.
It relies on the spontaneous symmetry breaking of chirality. The arising Goldstone Bosons are identified with the lightest mesons (π, K, η).
- ChPT is perturbative \Rightarrow Lagrangians depending on several coupling constants (LECs) which are not predicted by the theory.

LO	F_0, B_0	2
NLO	L_i^r	10+2
NNLO	C_i^r	90+4

Determination of LECs is important:

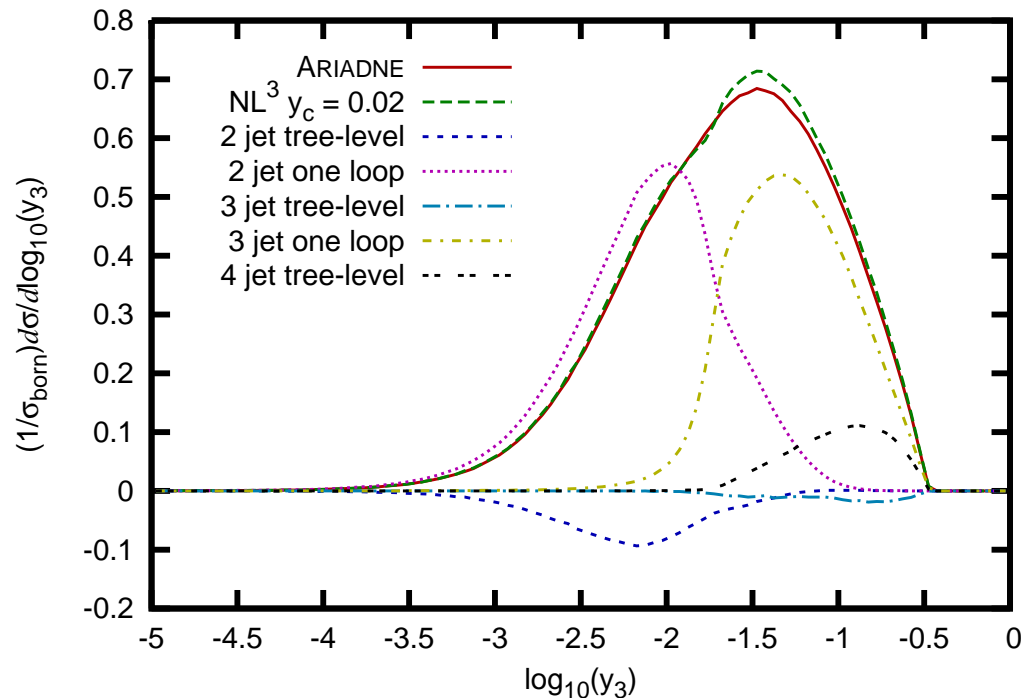
- to have precise predictions of ChPT
 - to check its convergence
 - to study the underlying QCD
-
- Large number + strong correlations \Rightarrow difficult task.
 - Possible solution: relations among observables calculated in ChPT such that many of the LECs cancel out.

More next year ...

Matching of Matrix Elements and Parton Showers

(Nils Lavesson; Leif Lönnblad (NL³))

- Matrix element to parton shower merging scheme has been extended to include one loop matrix elements with different parton multiplicities.
- Procedure is an extension of CKKW-L (previously presented).
- Proof of concept operational for $e^+e^- \rightarrow$ hadrons.
- To be published soon.



Differential three-jet rate (JADE)

ARIADNE pure shower

NL³ NLO matching scheme

other curves: contributions to NL³

Nils Ph.D. exam February 2009 \Rightarrow not more next year?