

Global Analyses at the Tevatron and LHC



First global analysis completed at Tevatron Run II (1 fb^{-1})



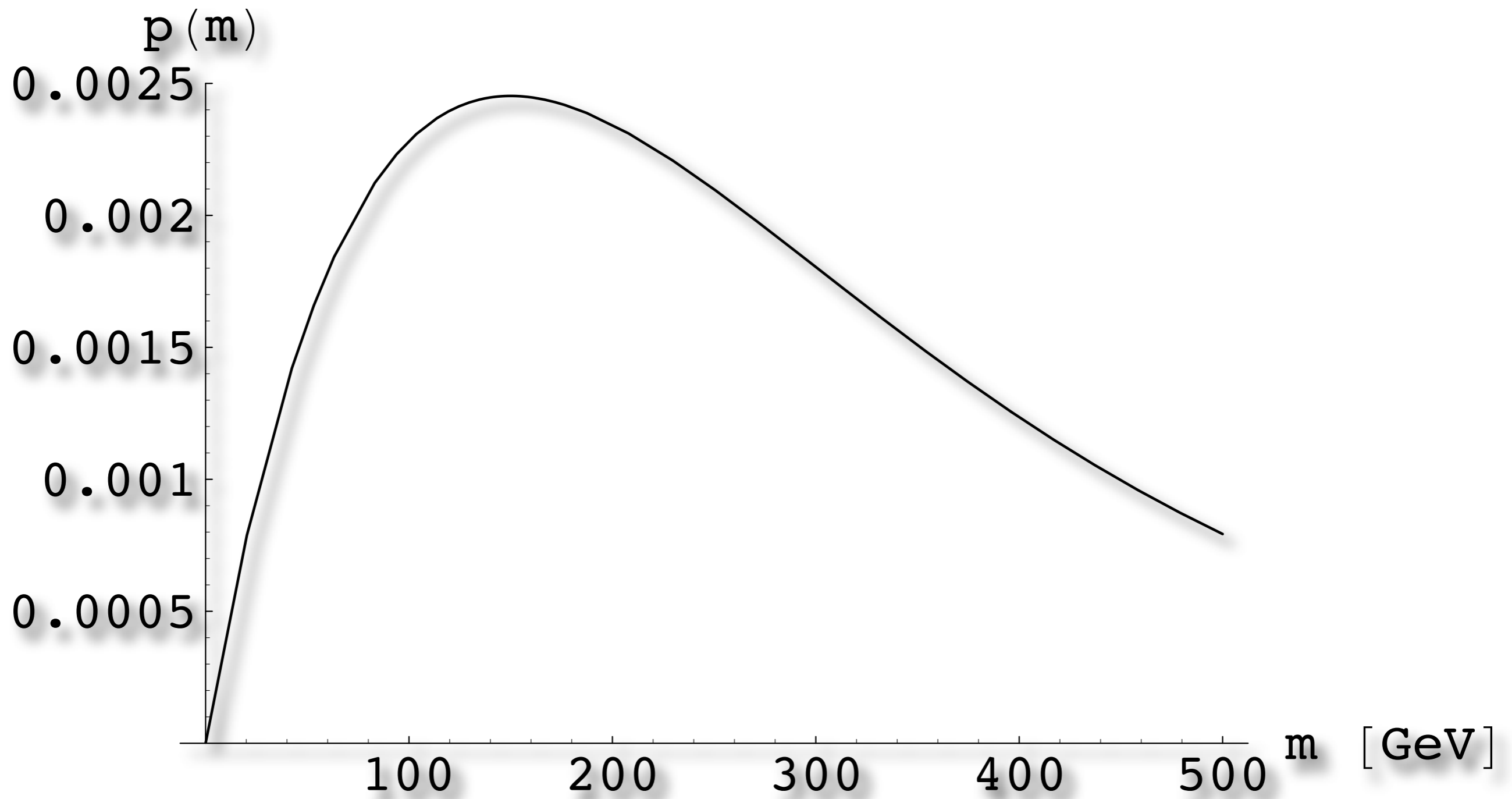
Georgios Choudalakis

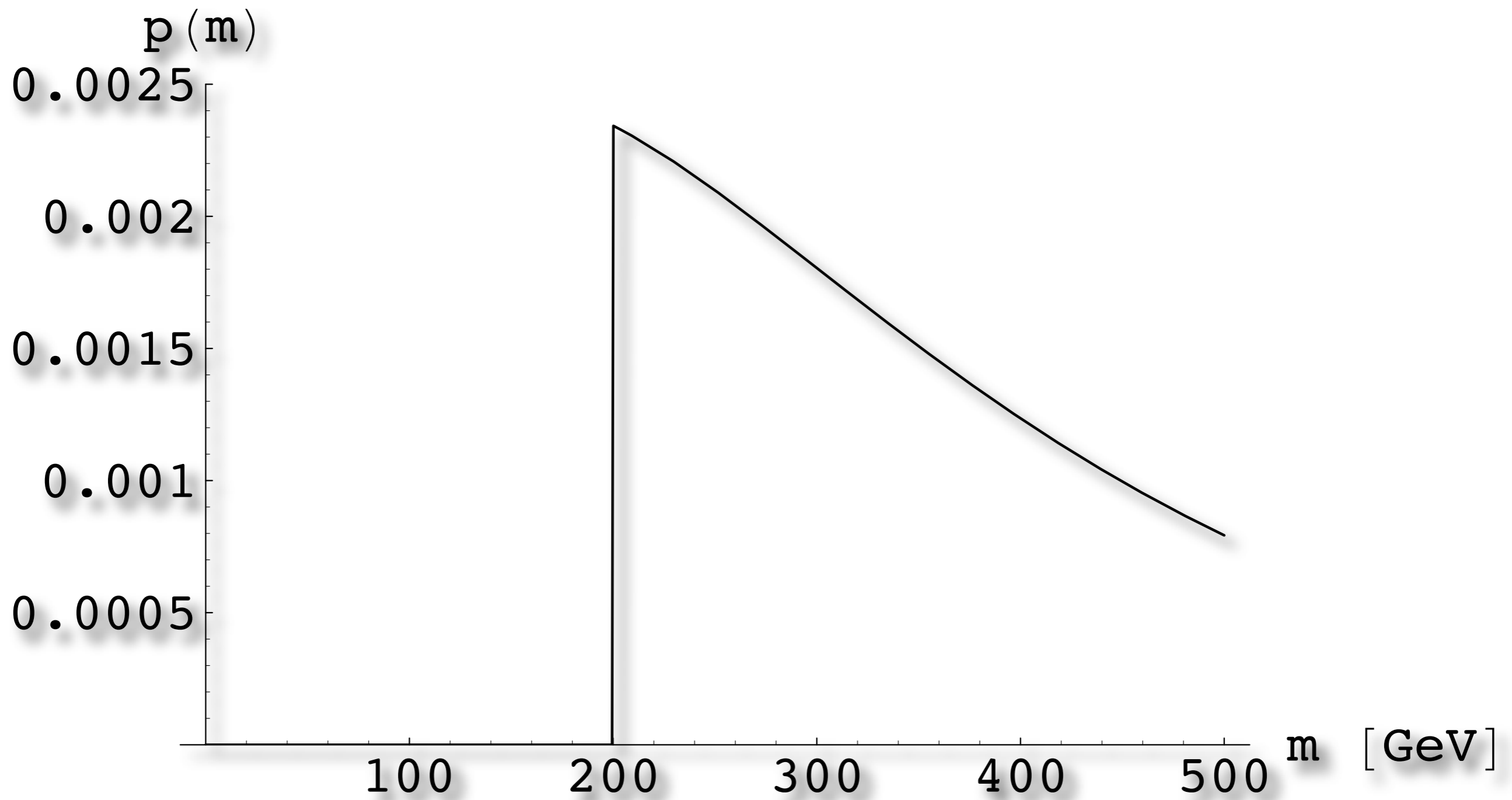


Conor Henderson

talks earlier this afternoon

This result is surprising





This result is roughly as surprising as
discovering the W and Z

and the top quark

and the Higgs boson

combined

Sleuth@DØRunI

Sleuth: quasi model independent search on high- p_T tails

Phys.Rev.D 62:092004, 2000

Phys.Rev.D 64:012004, 2001

Phys.Rev.Lett.86:3712, 2001



Bruce Knuteson



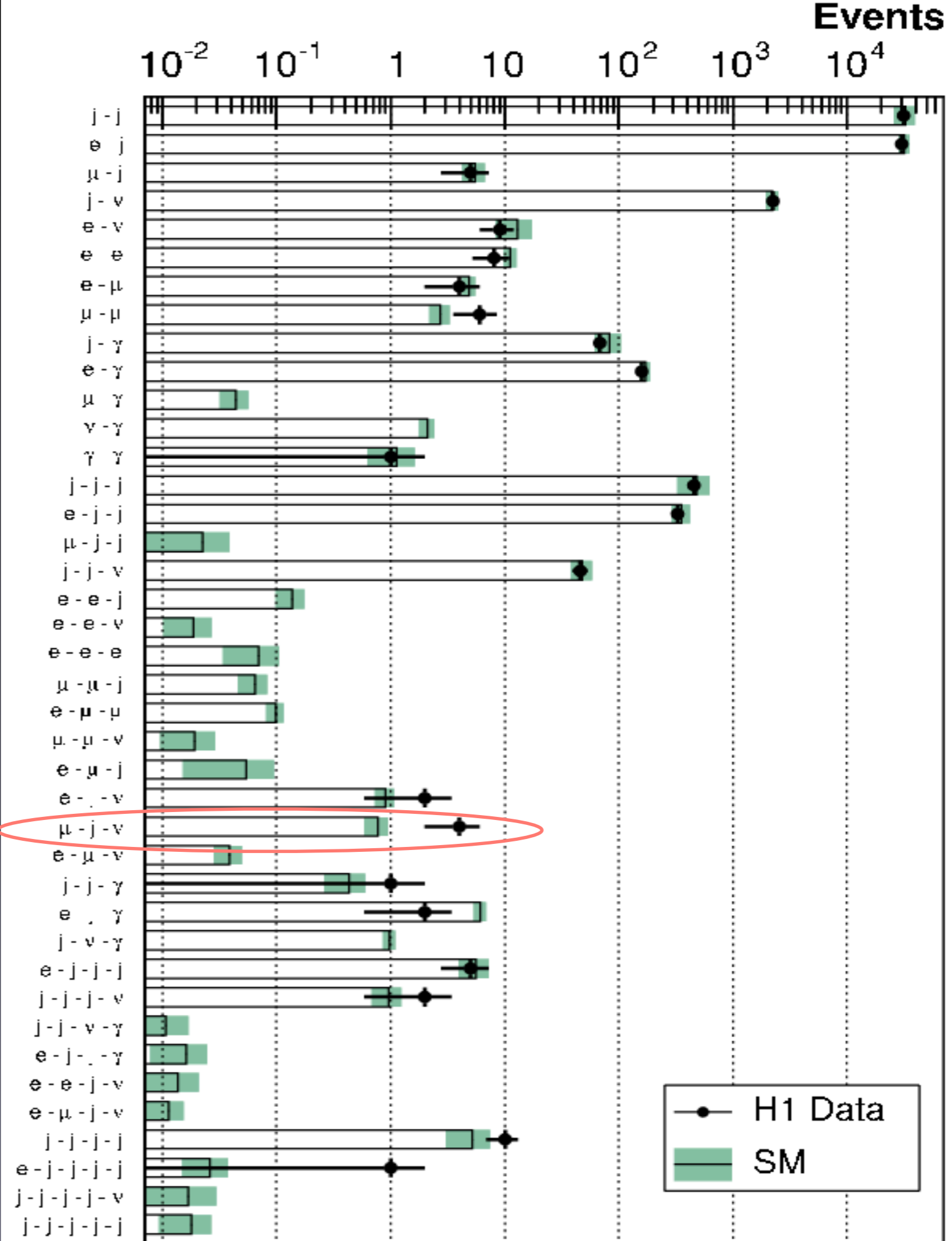
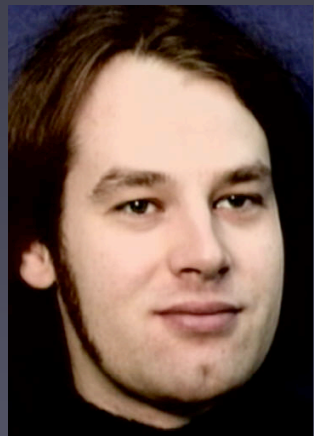
Data set	\mathcal{P}
$e\mu X$	
$e\mu\cancel{E}_T$	0.14 (+1.08 σ)
$e\mu\cancel{E}_T j$	0.45 (+0.13 σ)
$e\mu\cancel{E}_T 2j$	0.31 (+0.50 σ)
$e\mu\cancel{E}_T 3j$	0.71 (-0.55 σ)
W +jets-like	
$W 2j$	0.29 (+0.55 σ)
$W 3j$	0.23 (+0.74 σ)
$W 4j$	0.53 (-0.08 σ)
$W 5j$	0.81 (-0.88 σ)
$W 6j$	0.22 (+0.77 σ)
$e\cancel{E}_T 2j$	0.76 (-0.71 σ)
$e\cancel{E}_T 3j$	0.17 (+0.95 σ)
$e\cancel{E}_T 4j$	0.13 (+1.13 σ)
Z +jets-like	
$Z 2j$	0.52 (-0.05 σ)
$Z 3j$	0.71 (-0.55 σ)
$Z 4j$	0.83 (-0.95 σ)
$ee 2j$	0.72 (-0.58 σ)
$ee 3j$	0.61 (-0.28 σ)
$ee 4j$	→ 0.04 (+1.75 σ)
$ee\cancel{E}_T 2j$	0.68 (-0.47 σ)
$ee\cancel{E}_T 3j$	0.36 (+0.36 σ)
$ee\cancel{E}_T 4j$	→ 0.06 (+1.55 σ)
$\mu\mu 2j$	0.08 (+1.41 σ)
$(l/\gamma)(l/\gamma)(l/\gamma)X$	
eee	0.89 (-1.23 σ)
$Z\gamma$	0.84 (-0.99 σ)
$Z\gamma j$	0.63 (-0.33 σ)
$ee\gamma$	0.88 (-1.17 σ)
$ee\gamma\cancel{E}_T$	0.23 (+0.74 σ)
$e\gamma\gamma$	0.66 (-0.41 σ)
$e\gamma\gamma j$	0.21 (+0.81 σ)
$e\gamma\gamma 2j$	0.30 (+0.52 σ)
$W\gamma\gamma$	0.18 (+0.92 σ)
$\gamma\gamma\gamma$	0.41 (+0.23 σ)
\bar{p}	→ 0.89 (-1.23 σ)

H1 General Search

significant improvement and simplification to search algorithm

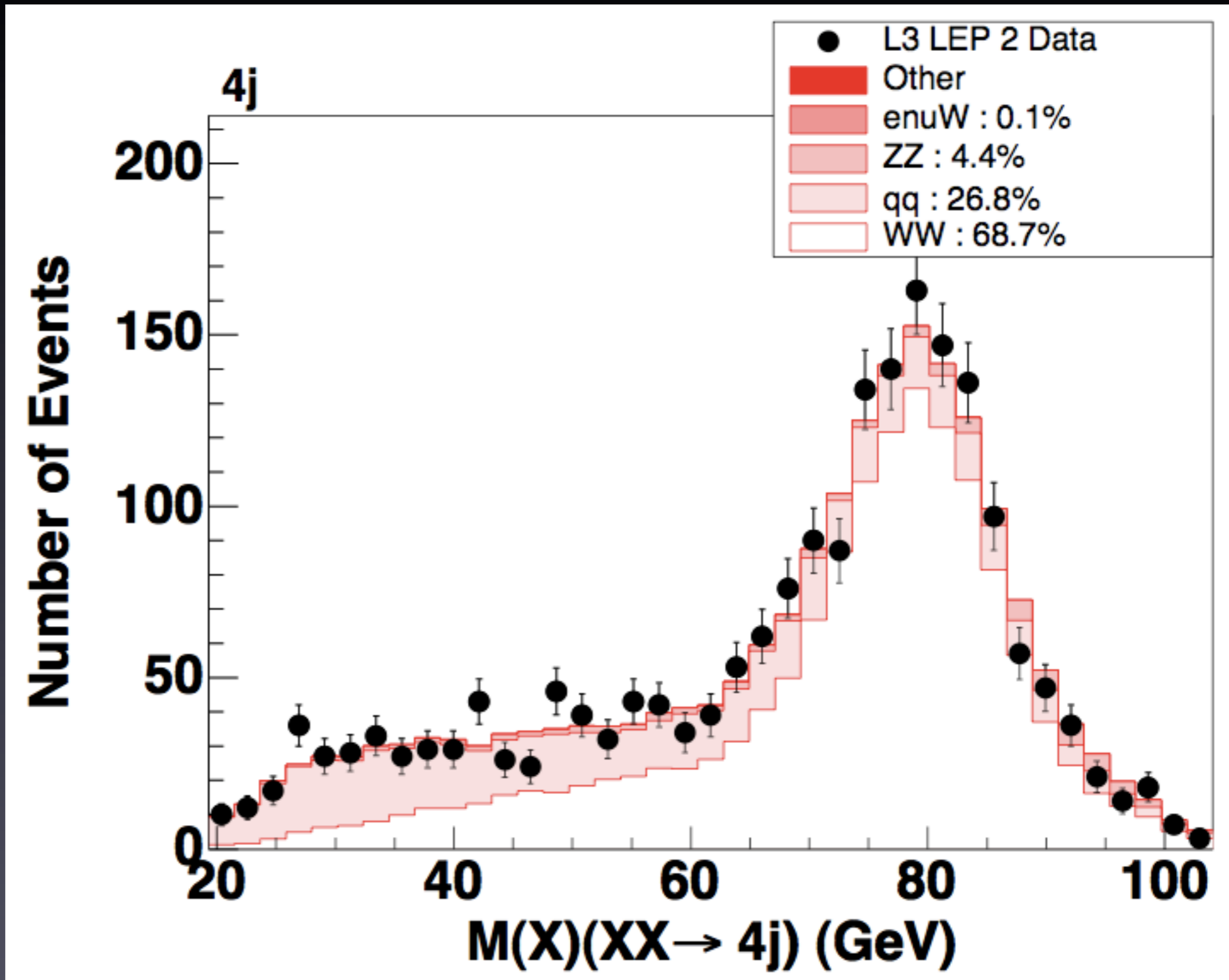
Phys.Lett.B 602:14-30,2004

"isolated lepton" events \rightarrow
 $\mathcal{P} = 0.04$

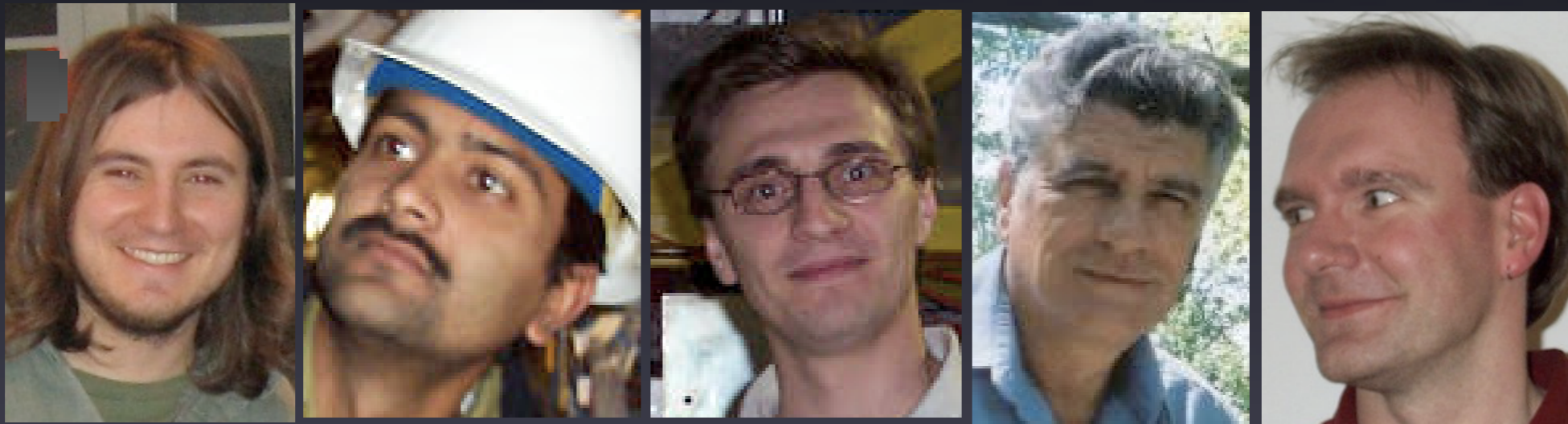


LEP 2

VISTA@L3, VISTA@ALEPH

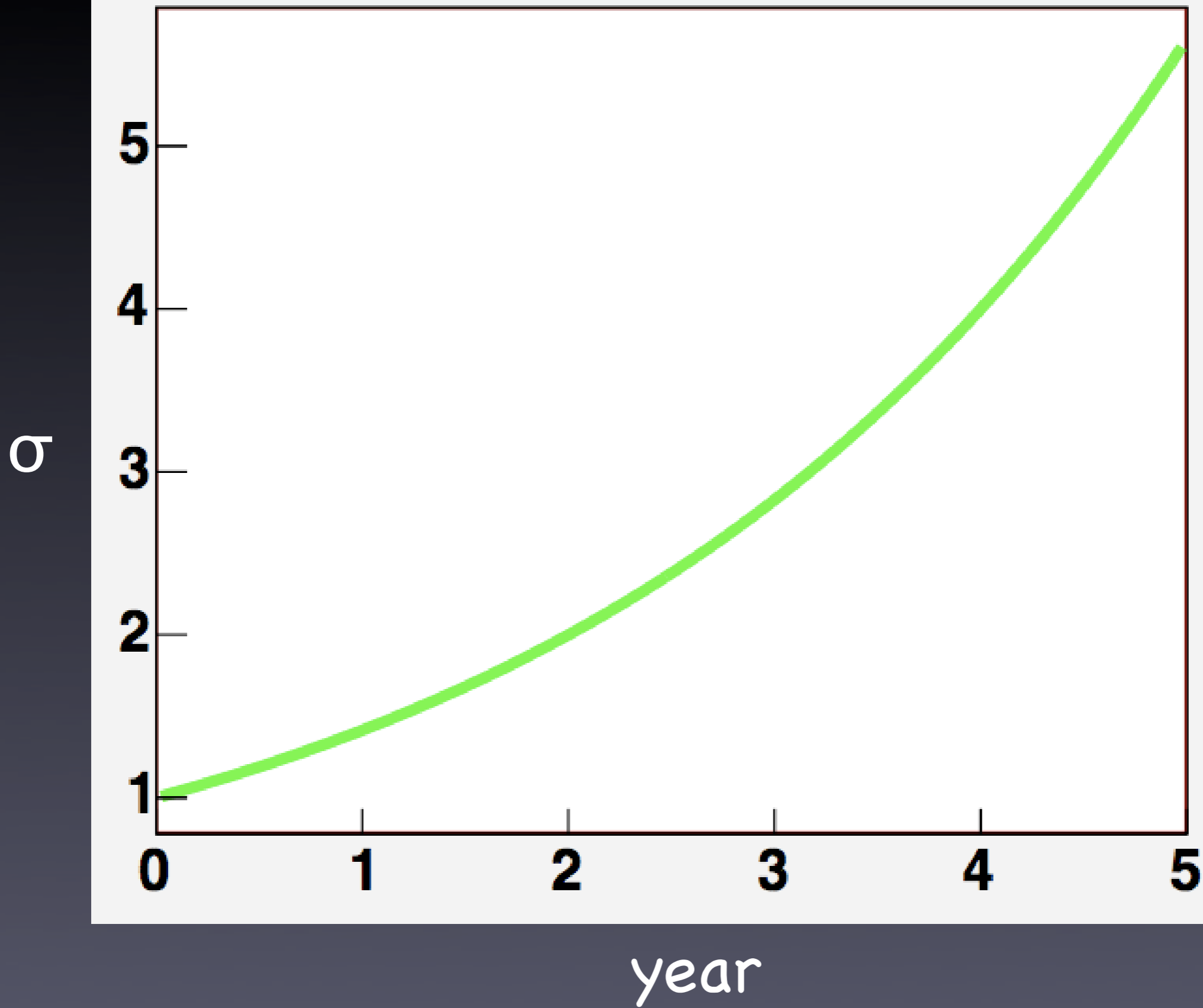


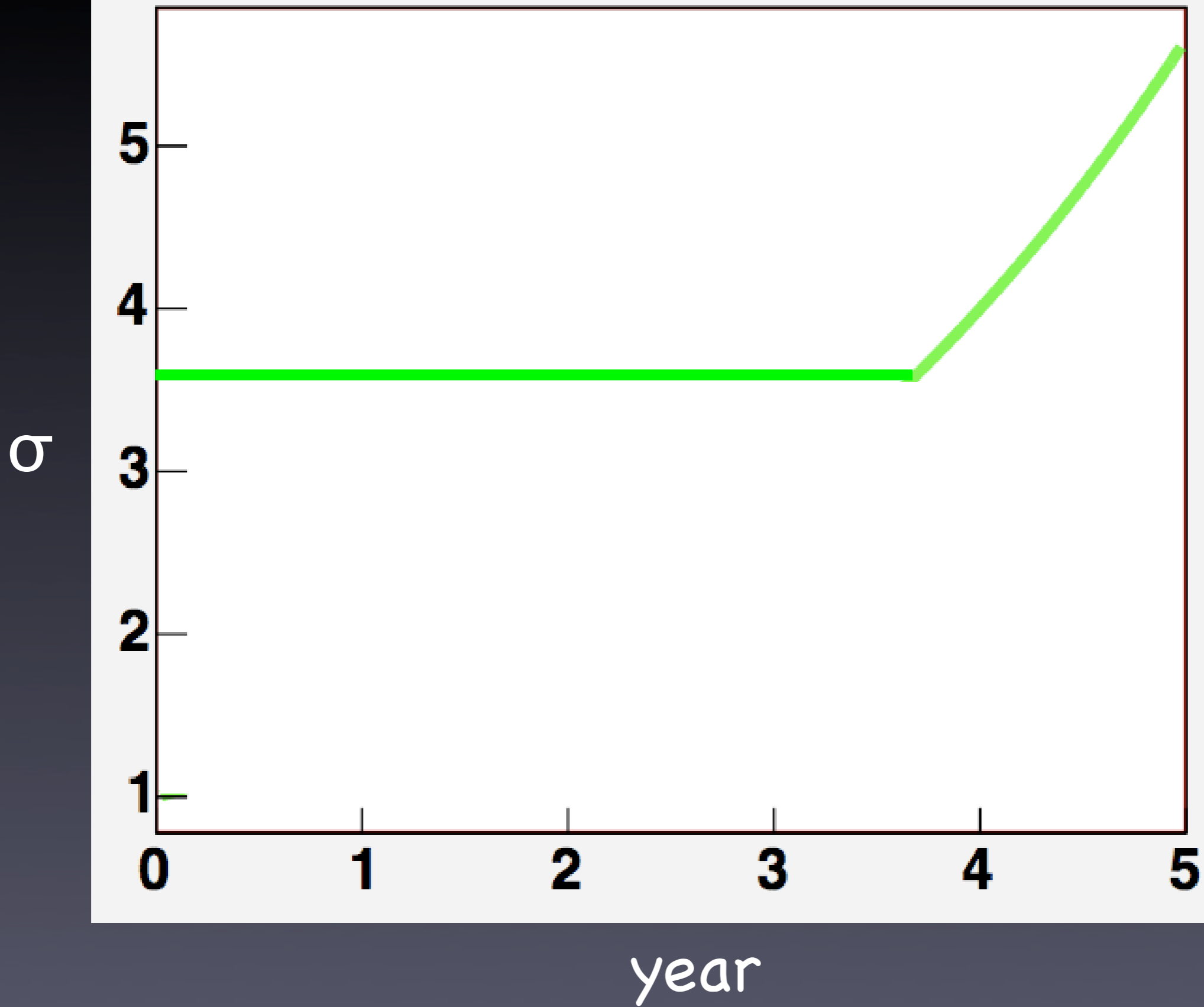
Global analysis at DØ Run II

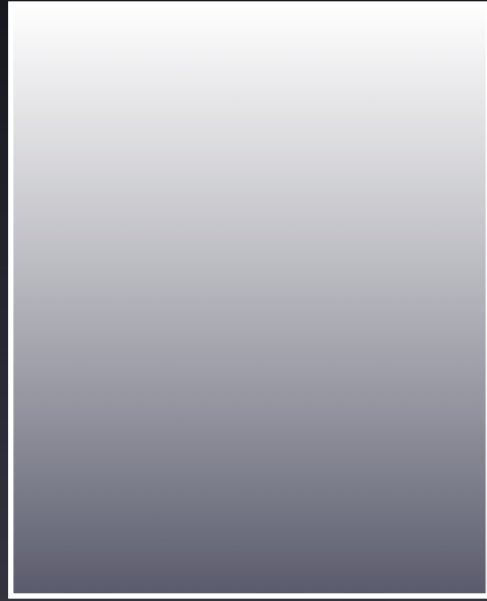


Doubling of data
Value: ≈ 300 M\$

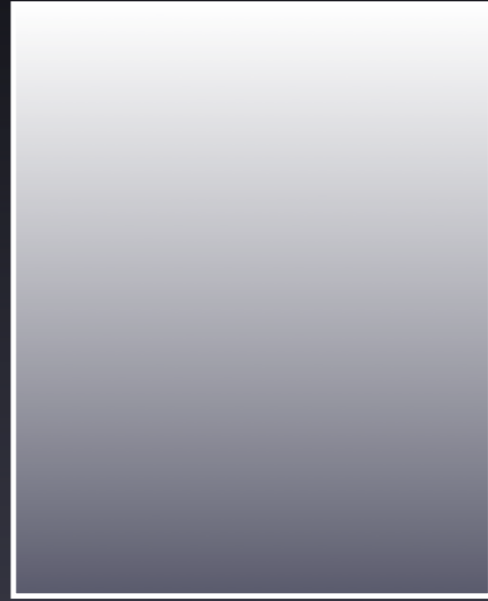
talk earlier this afternoon



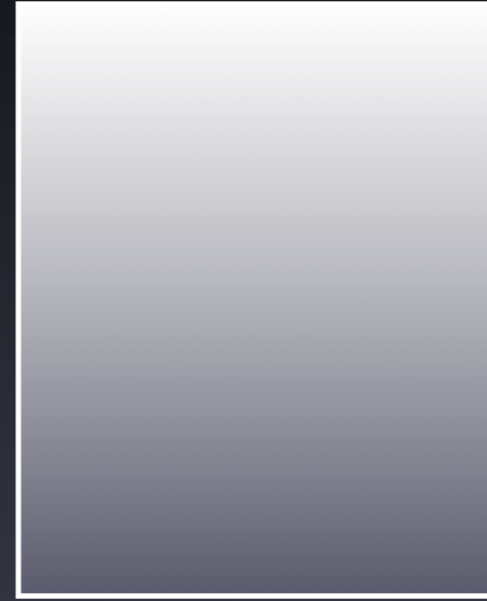




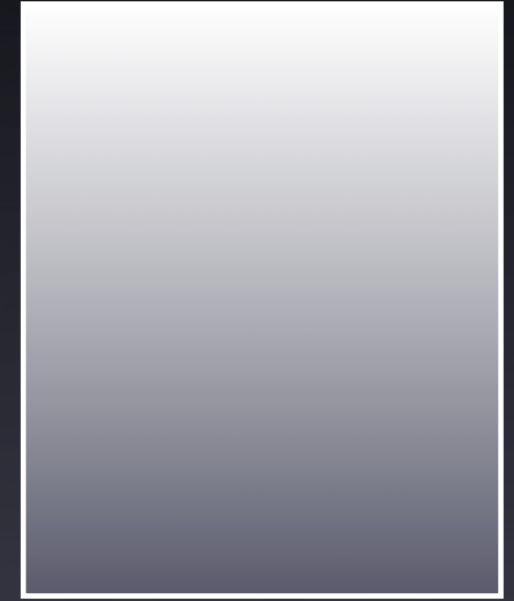
Statistical
fluctuation



Detector
effect



Poor
prediction



Plausible
interpretation

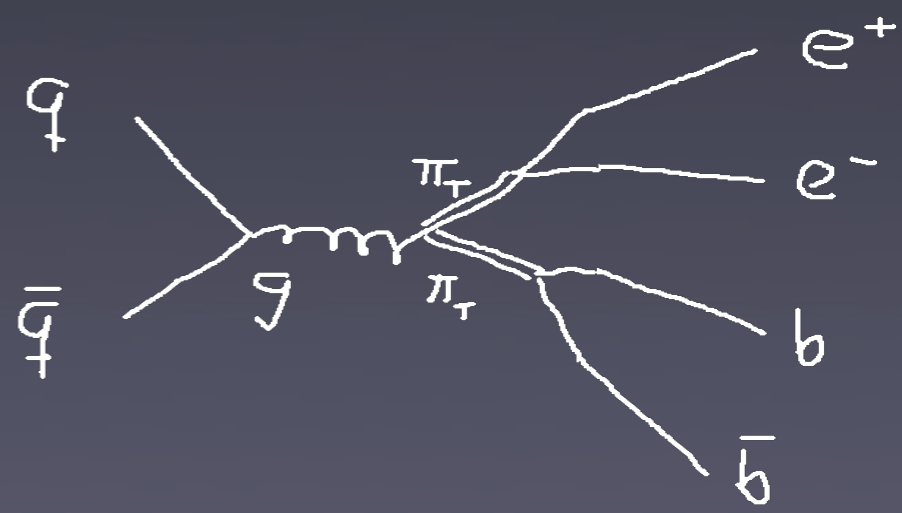
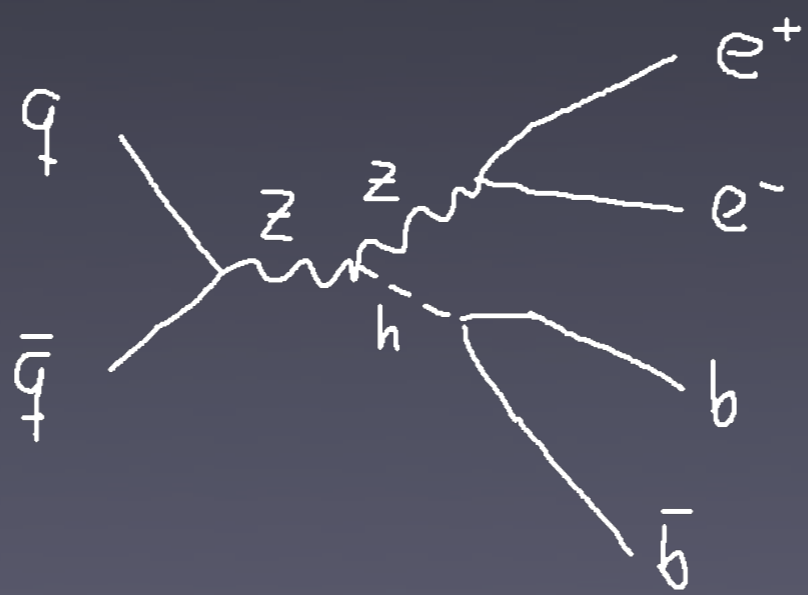
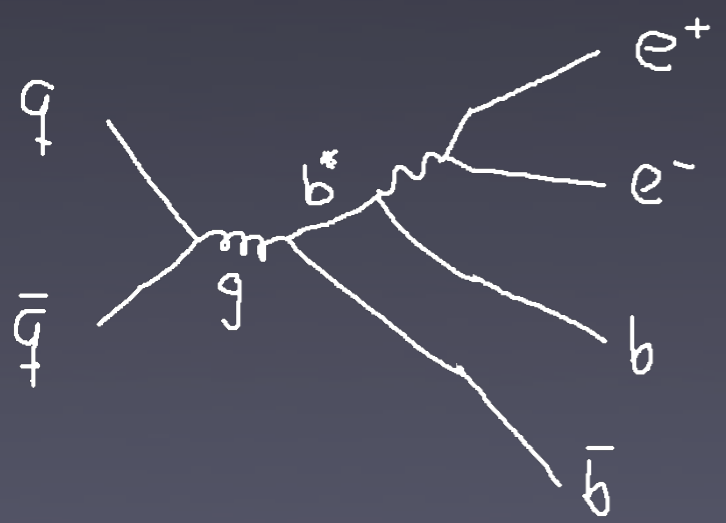


Bard

hep-ph/0602101



Stories

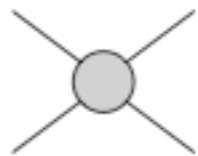


MARMOSET

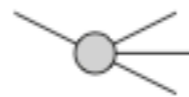
Berkeley
Harvard
FNAL
MIT
Princeton

Theorists+
Experimentalists

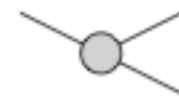
OSET



Production Mode A

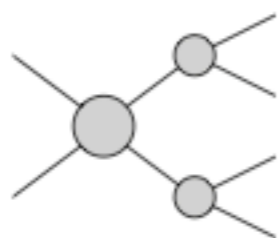


Decay Mode 1

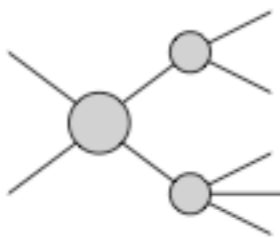


Decay Mode 2

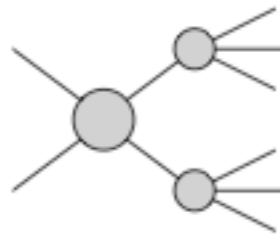
Monte Carlo



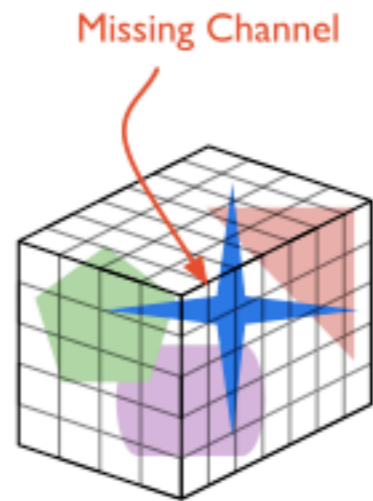
$$= \text{mc_A11} \times \sigma_A \times Br_1 \times Br_1$$



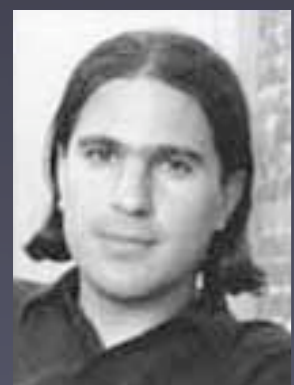
$$= \text{mc_A12} \times 2 \times \sigma_A \times Br_1 \times Br_2$$



$$= \text{mc_A22} \times \sigma_A \times Br_2 \times Br_2$$



LHC
Signatures



hep-ph/0703088

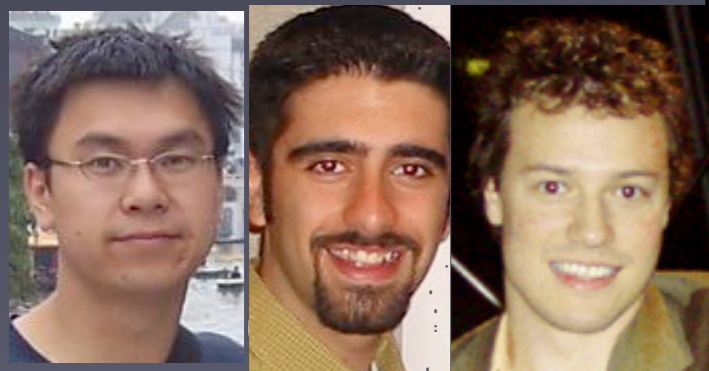
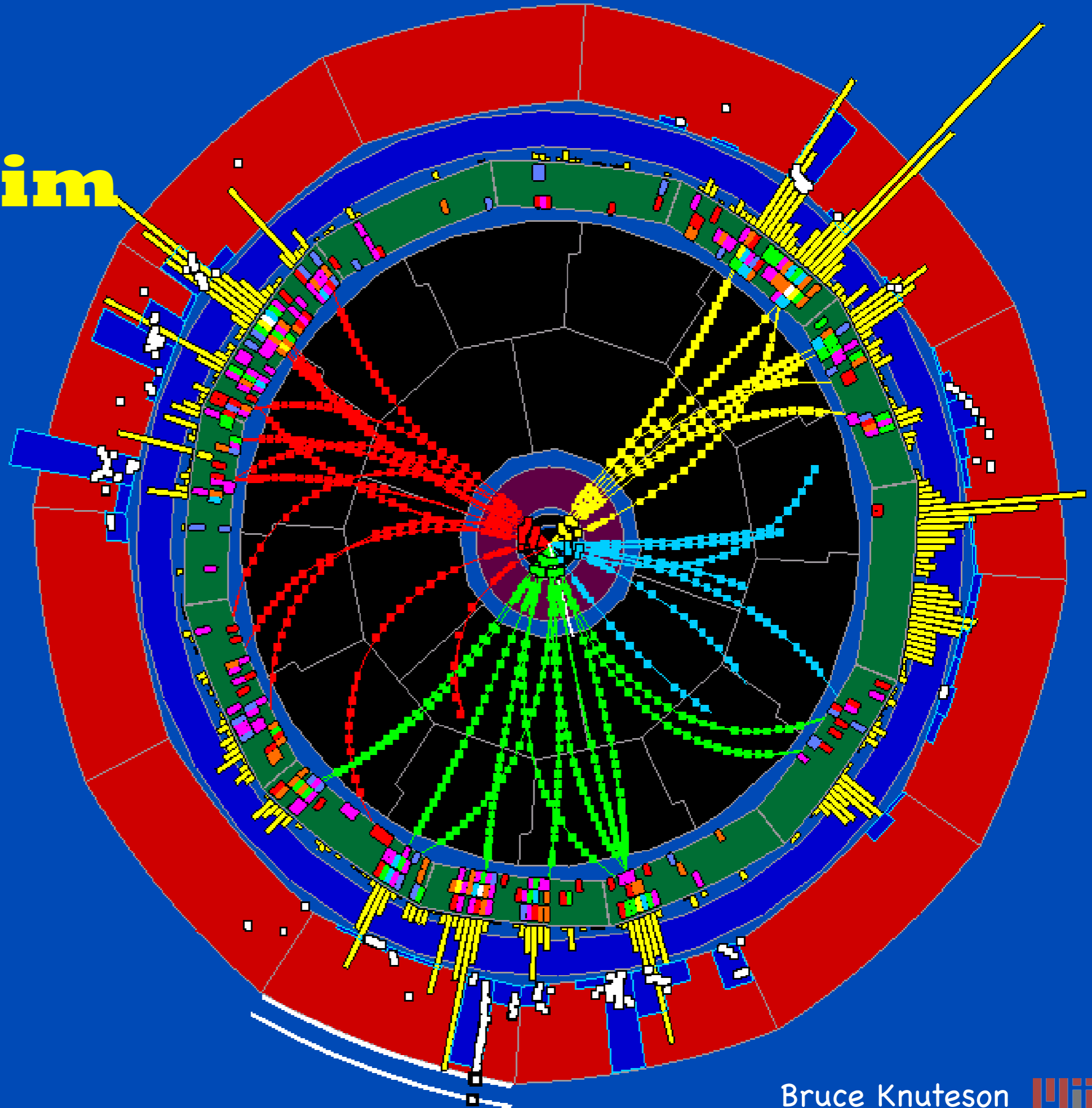
Full simulation:
100 seconds

TurboSim



A fast detector
simulation that
tunes itself to any
experiment's
detailed detector
simulation

TurboSim:
10 milliseconds



Quaero@H1

arXiv.org > hep-ph > hep-ph/0612201

Search for

([Help](#) | [Advanced search](#))

All papers

Go!

High Energy Physics – Phenomenology, abstract hep-ph/0612201

From: Bruce Knuteson [[view email](#)]

Date: Sat, 16 Dec 2006 01:43:45 GMT (631kb)

Quaero@H1: An Interface to High-pT HERA Event Data

Authors: [Sascha Caron](#), [Bruce Knuteson](#)

Comments: Submitted to Eur. Phys. J. C

Distributions from high-pT HERA event data analyzed in a general search for new physics at H1 have been incorporated into Quaero, an algorithm designed to automate tests of specific hypotheses with high energy collider data. The use of Quaero@H1 to search for leptoquarks, R-parity violating supersymmetry, and excited quarks provides examples to develop intuition for the algorithm's performance.

Full-text: [PostScript](#), [PDF](#), or [Other formats](#)



Approved by H1, released

Quaero

A General Interface to HEP Data

[Help](#)

Signal

Select the generator for your signal:

- Pythia [\(documentation\)](#) Suspect [\(documentation\)](#) MadEvent [\(documentation\)](#)

Datacard file:

Upload a file with the (generator specific) datacards for your signal.

no file...lected

Example datacards:

- Pythia: [Leptoquark](#)
- Suspect: [mSUGRA](#)
- Madevent: [Excited quark](#)

You can download one of these example datacards and then upload it using the field on the right. See the [help](#) page for more examples.

Requestor

Email address:

You will be notified when your results are ready.

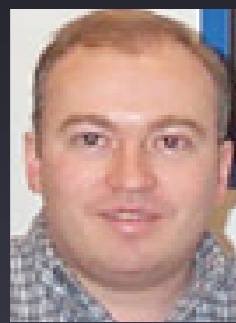
Short model description:

Target time:

Analysis time limit, in units of whole kiloseconds.

Password:

Data from Aleph, L3, and CDF Run II are currently password protected, accessible only by collaboration members.



Vista@CMS

Specification of offline trigger
and complete Standard Model
background estimate

Pass #0 is complete

Si Xie
MIT

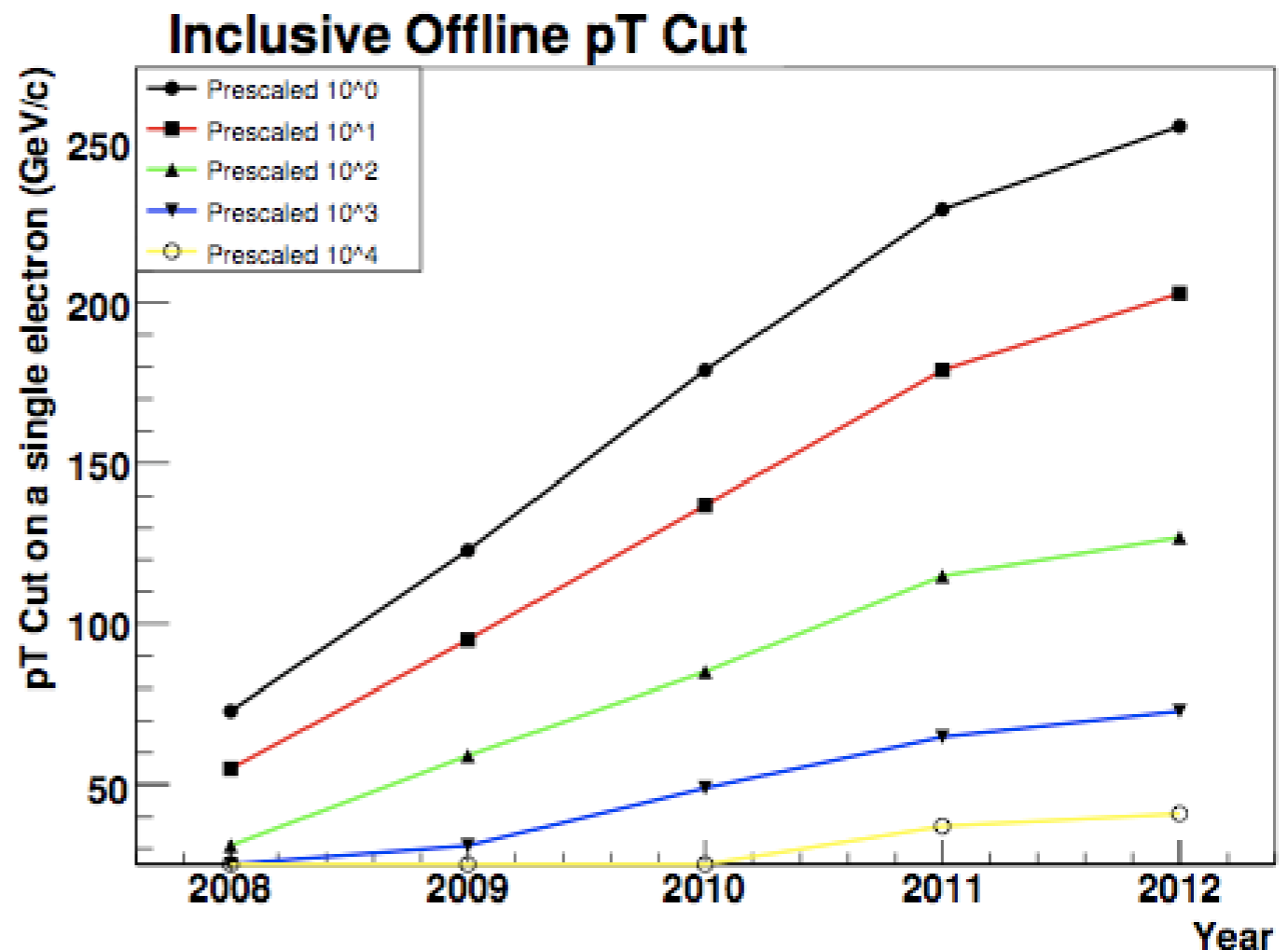
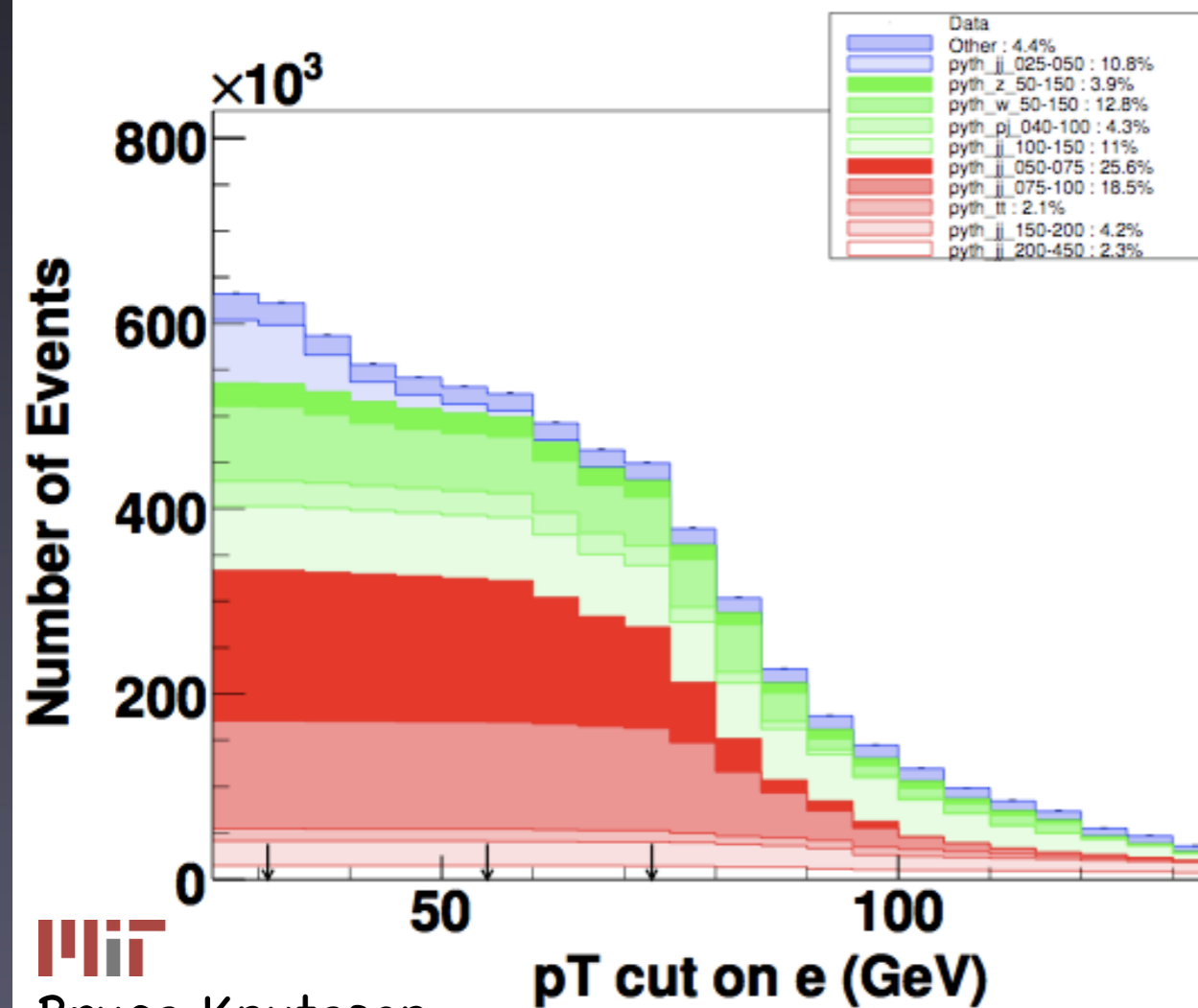



The VISTA LHC Offline Trigger

Si Xie* and Bruce Knuteson†
MIT

Stephen Mrenna‡
FNAL

(Dated: February 28, 2007)





If a core group
of 4 people
pursue Vista, it
is an endgame



If a core group
of 24 people
pursue Vista, it
is an opening
gambit

Summary



Novel technique

Null result is of high intrinsic value

Significant chance for discovery