

Prediction of Inclusive Jet E_T at the LHC

S. R. Magill
Argonne National Laboratory

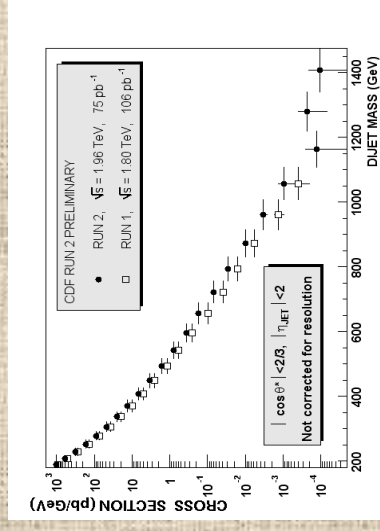
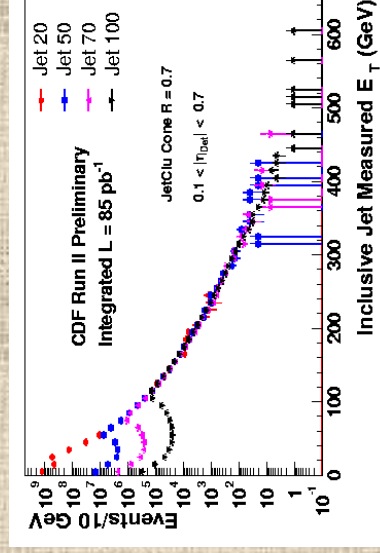
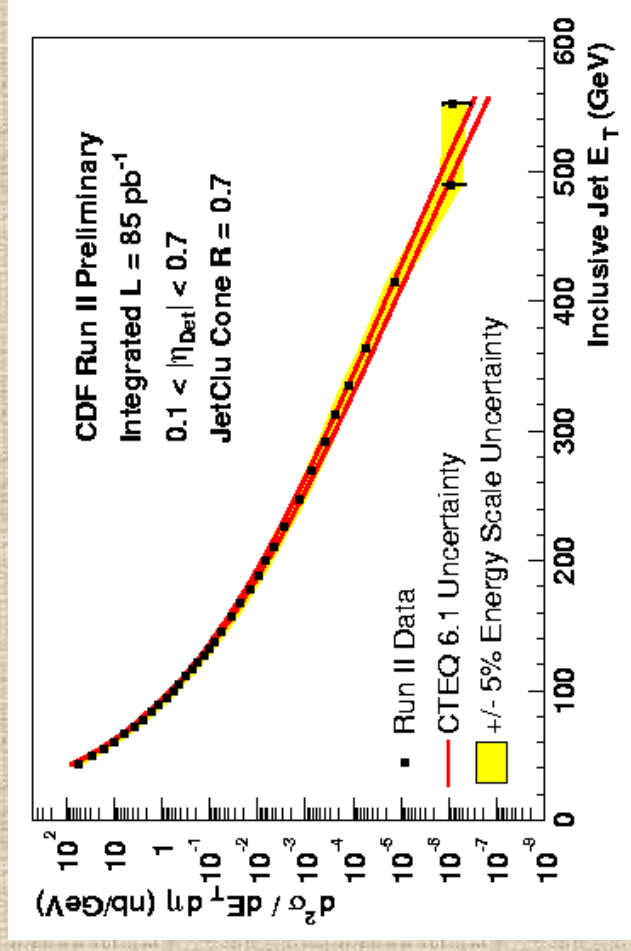
Could be the first physics measurement to come from LHC
-> evaluation of compositeness limit

For HERA-LHC Workshop

-> study effects of evolution schemes on inclusive jet E_T
cross section – PYTHIA vs CASCADE

Jets and Compositeness Limits

- Essentially, the limit on a contact interaction term is set by the highest E_T jet you see, times ~ 4
- Center-of-mass energy is immensely more valuable than integrated luminosity
 - Even the Tevatron 8.8% increase in energy **triples** the cross-section for jets above 500 GeV
 - Imagine what a 600% increase buys you!



From T. LeCompte, ANL

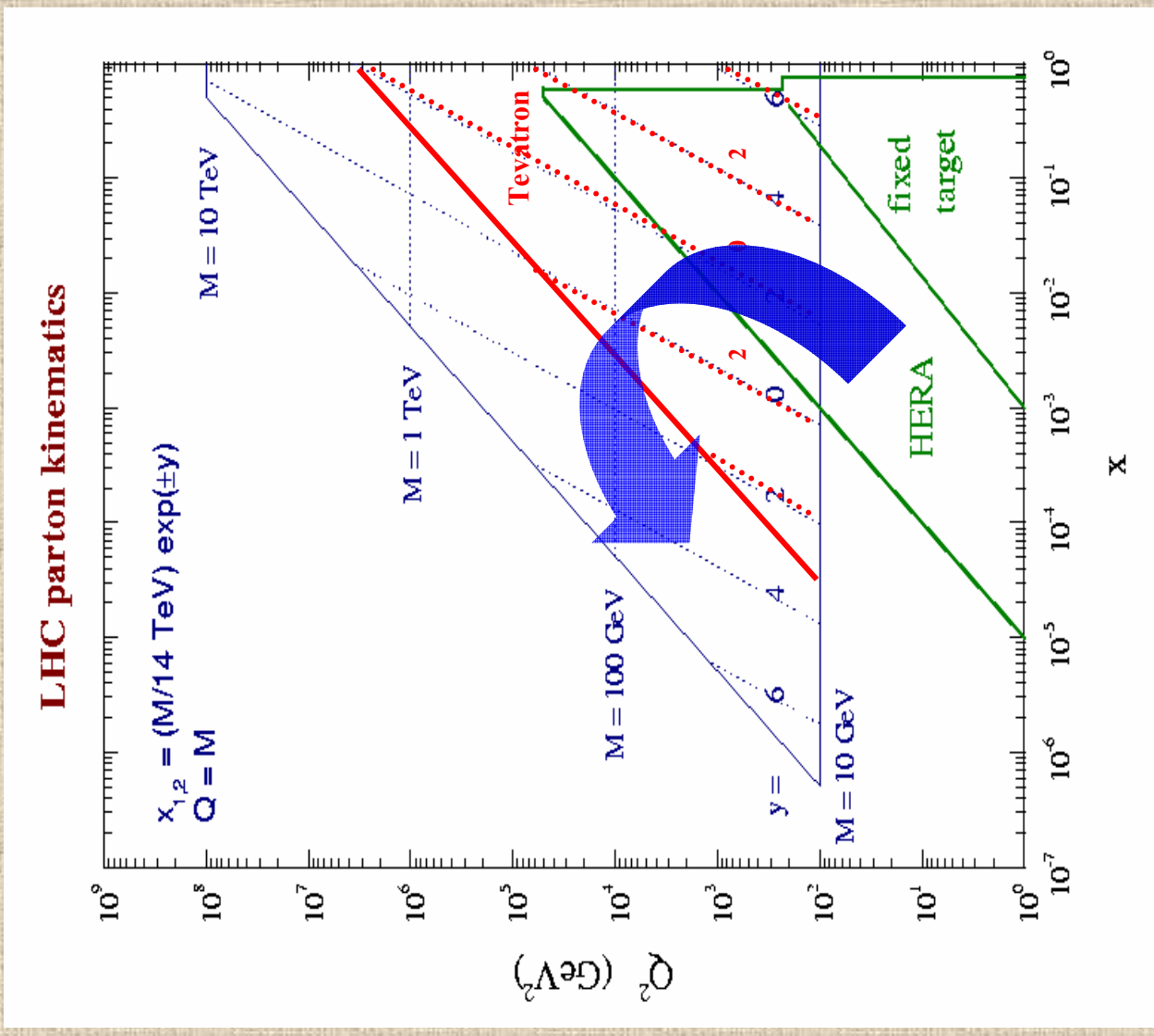
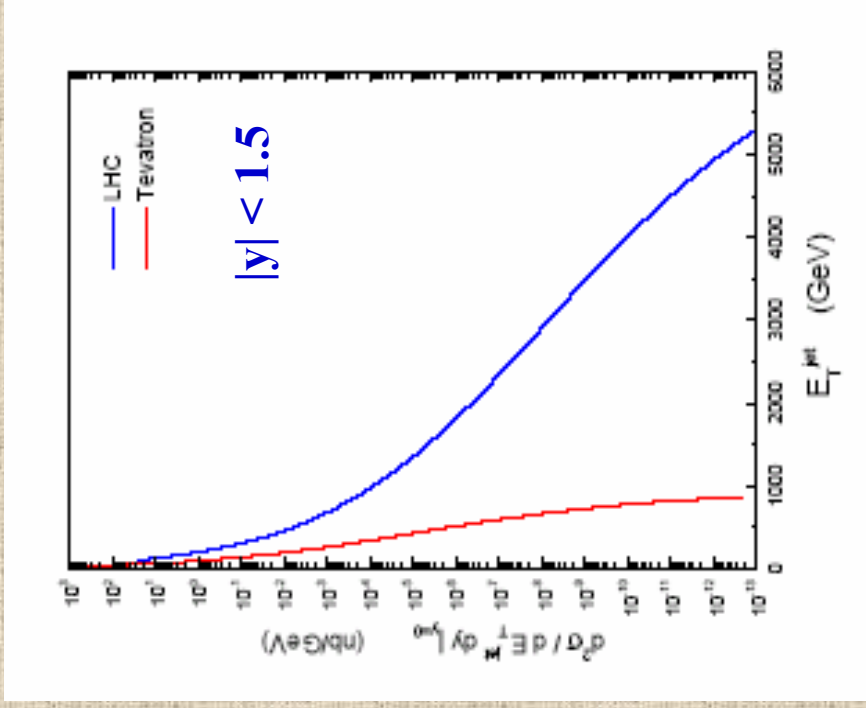
Comparison of LHC/TeVatron

Scenario	Name	Instantaneous Luminosity	Time(s)	Detector Fraction	Integrated Luminosity
1	First store	5×10^{30}	1000	50%	2.5 nb^{-1}
2	First good week	10^{31}	10^5	100%	1 pb^{-1}
3	First good month	2×10^{31}	10^6	100%	20 pb^{-1}
4	Not so good year	10^{32}	10^7	100%	1 fb^{-1}
5	Good 1 st year	10^{33}	10^7	100%	10 fb^{-1}

Scenario	Name	Energy Scale	Max E_T Jet	Limit
1	First store	20%	$\sim 750 \text{ GeV}$	$\sim 2.4 \text{ TeV}$
2	First good week	20%	$\sim 1600 \text{ GeV}$	$\sim 5.1 \text{ TeV}$
3	First good month	10%	$\sim 2 \text{ TeV}$	$\sim 7.2 \text{ TeV}$
4	Not so good year	5%	$\sim 3 \text{ TeV}$	$\sim 11.4 \text{ TeV}$
5	Good 1 st year	2%	$\sim 3.5 \text{ TeV}$	$\sim 13.7 \text{ TeV}$

ATLAS
 matches TEV
 limit with first
 store! - publish
 new limit after
 2 days running

HERA \Rightarrow Tevatron \Rightarrow LHC



Evolution in Q^2, x

Change in shape of curve?