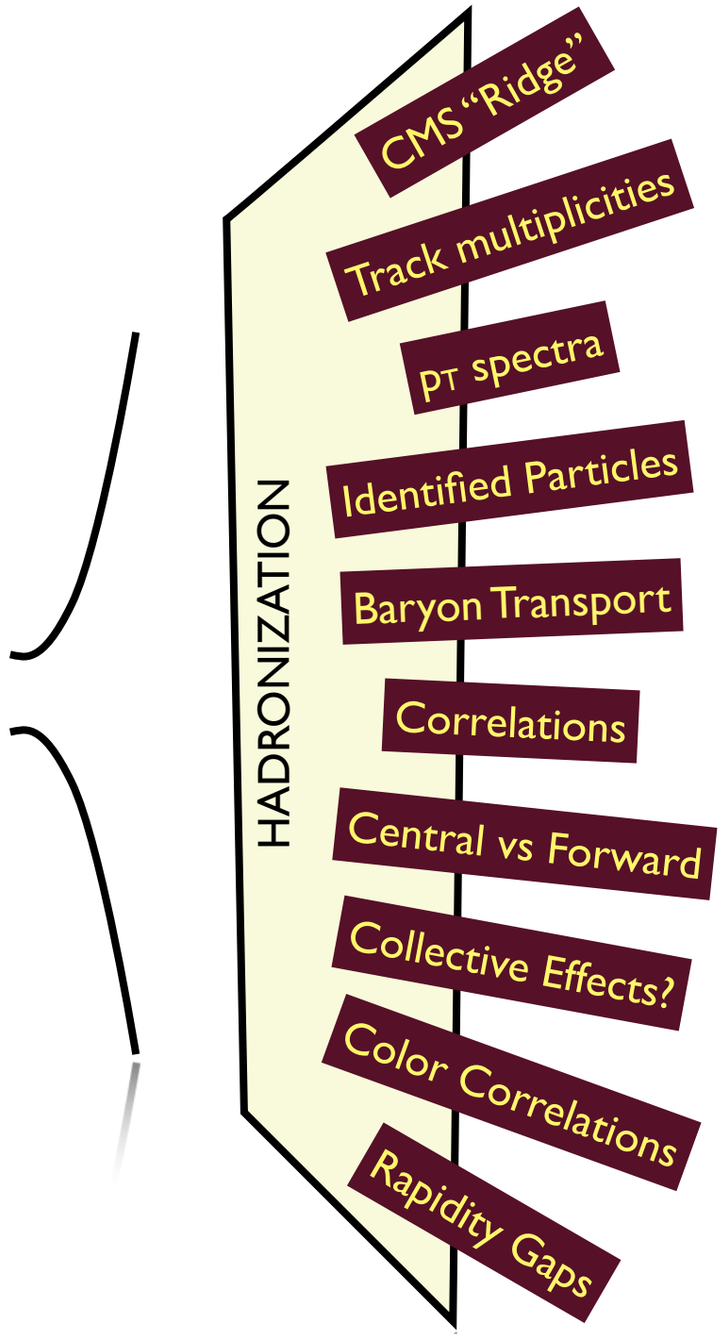
Peter
Skands

Early LHC Data

A simple question:

What does the *average* LHC collision look like?



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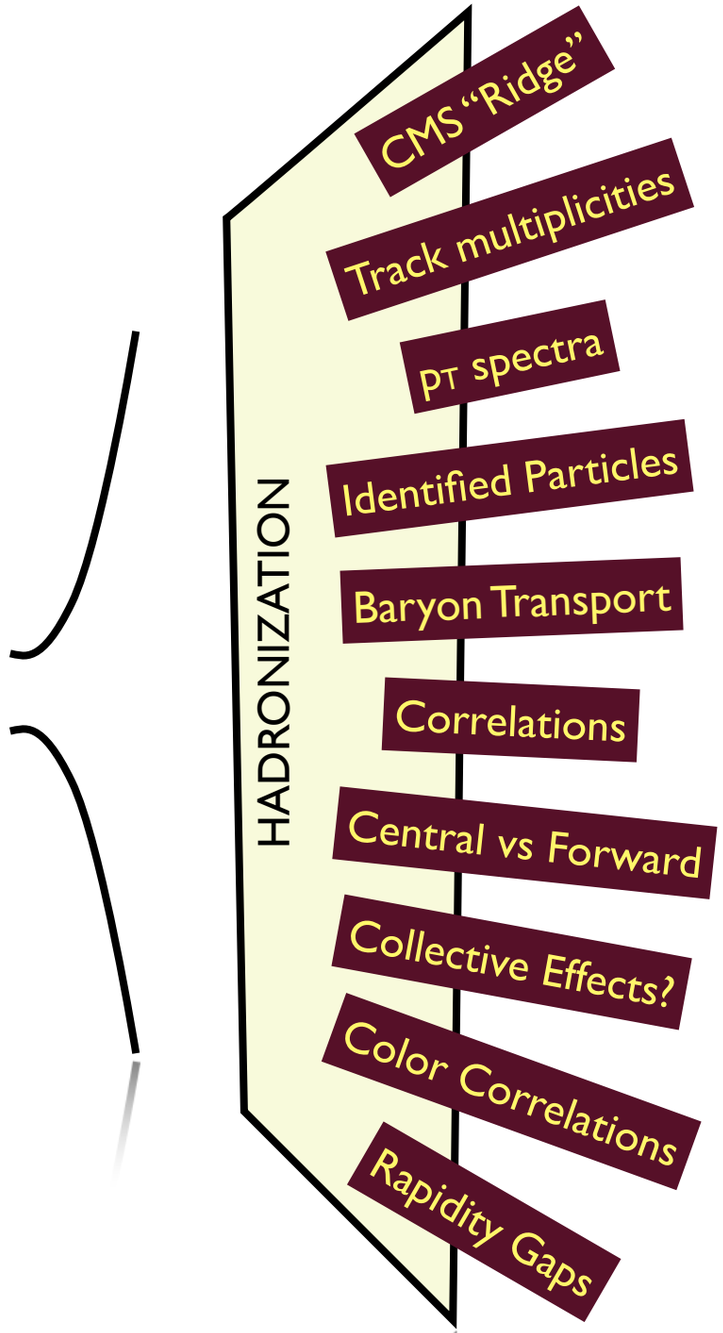
"Minimum-Bias"

~ All collisions with ≥ 1 particle hitting something

NO HARD SCALE

Extremely sensitive to IR effects

→ Excellent LAB for studying IR effects



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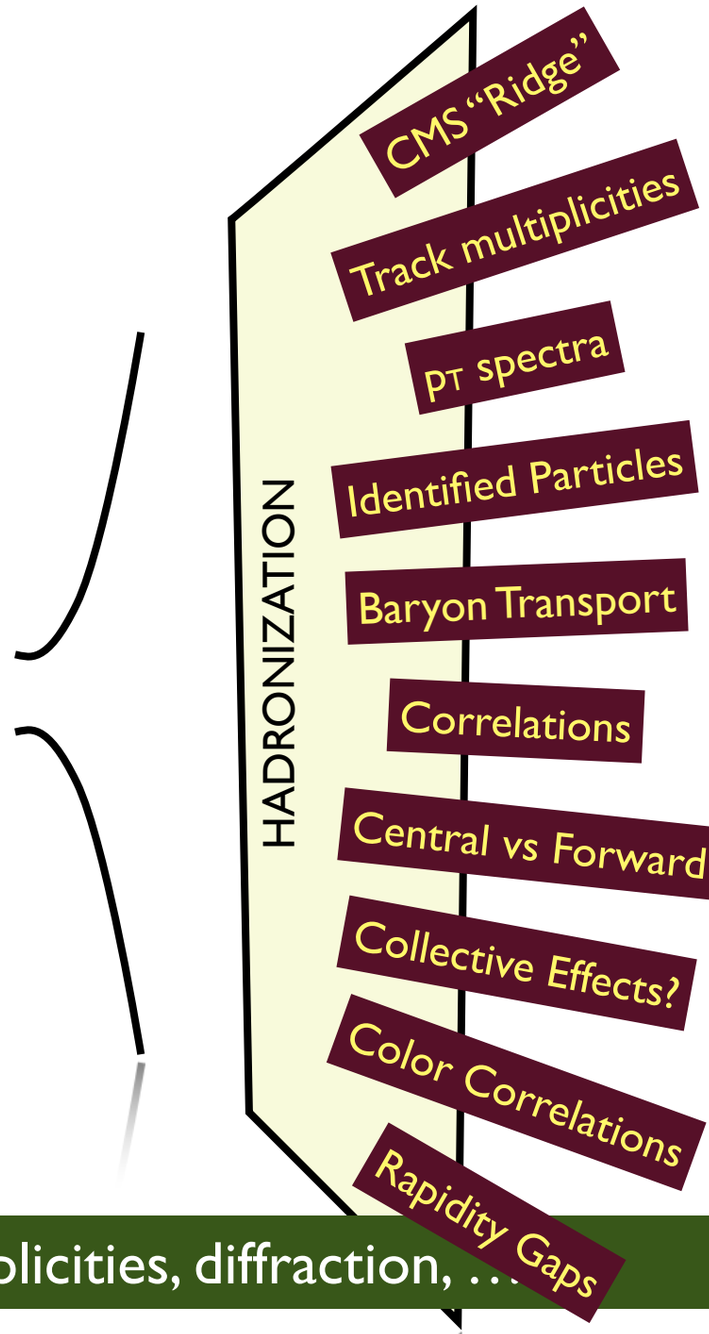

~ ∞ statistics + tails → perturbative QCD, high-multiplicities, diffraction, …

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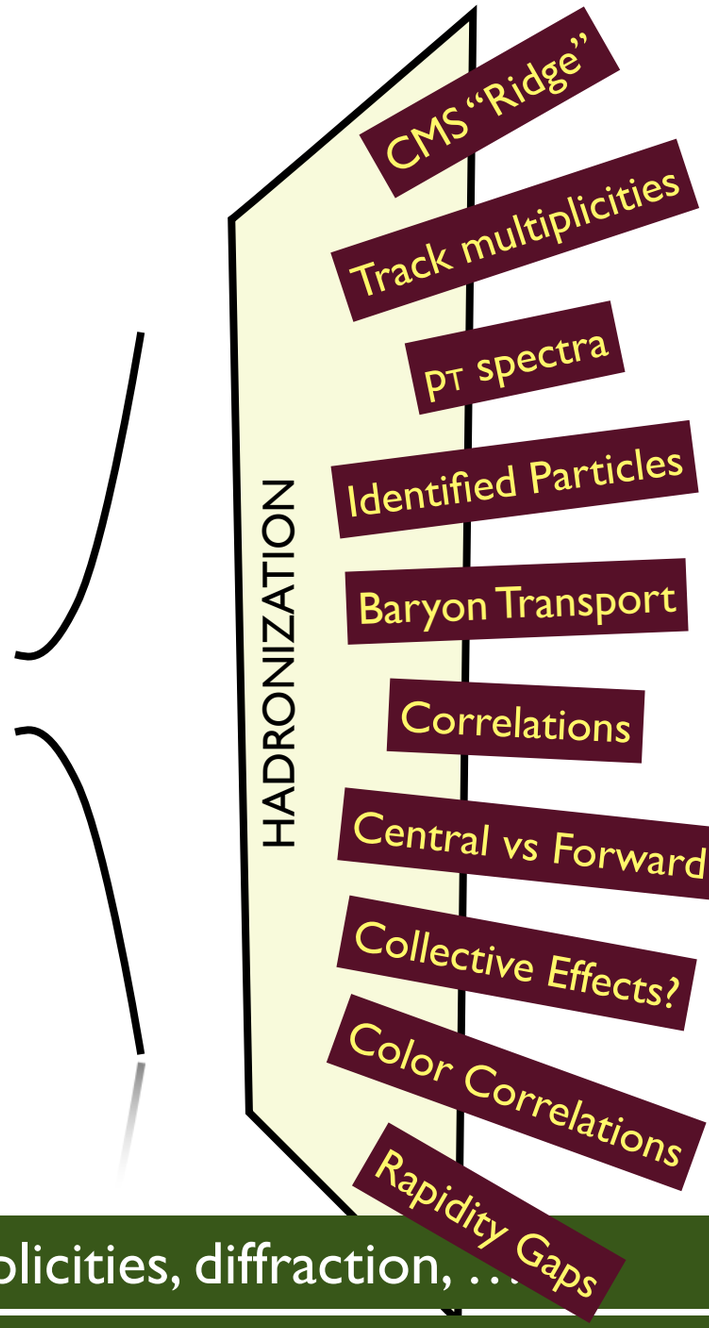
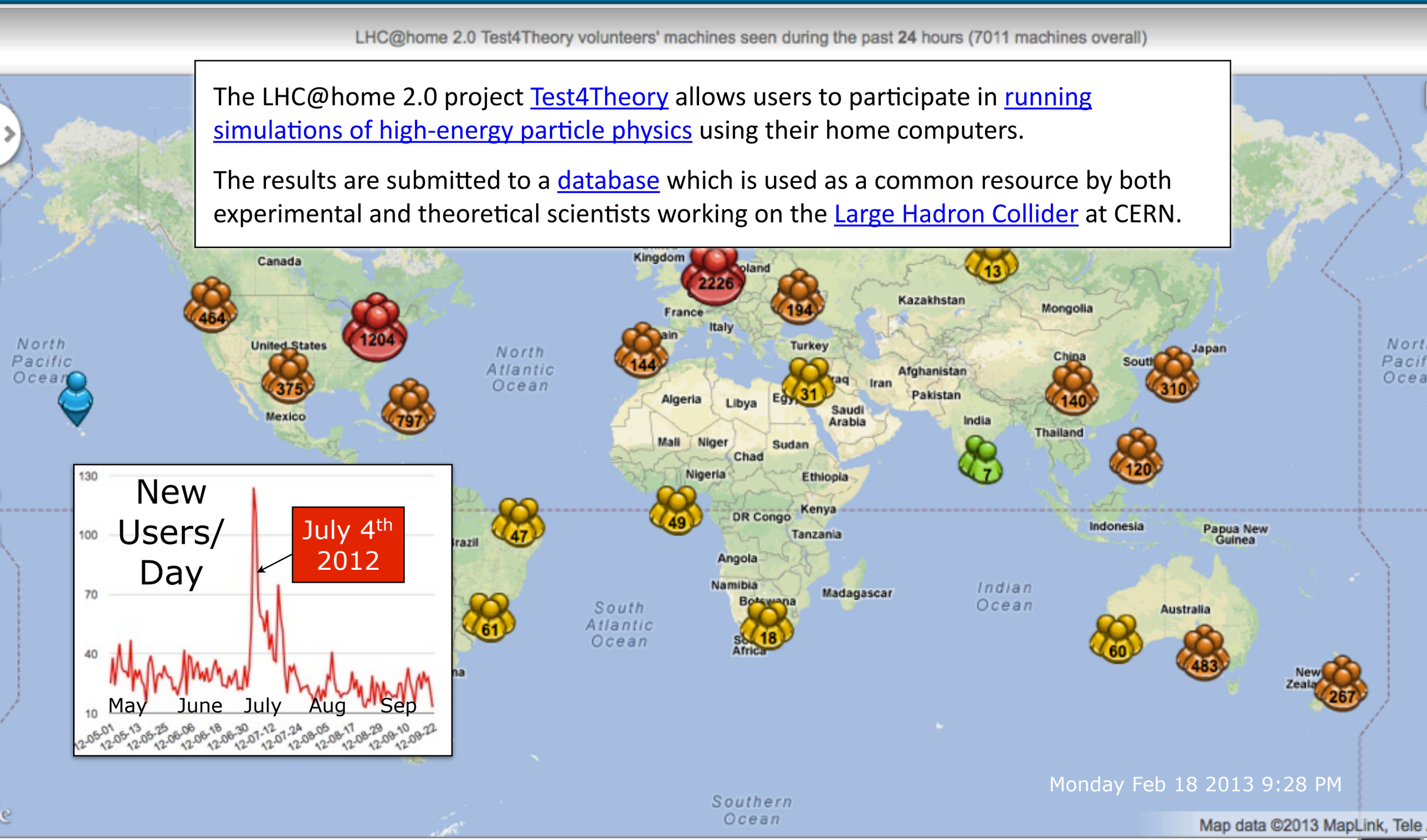


~ ∞ statistics + tails → perturbative QCD, high-multiplicities, diffraction, …

+ universality → can constrain models and re-use for hard processes → underlying event

Test4Theory - LHC@home

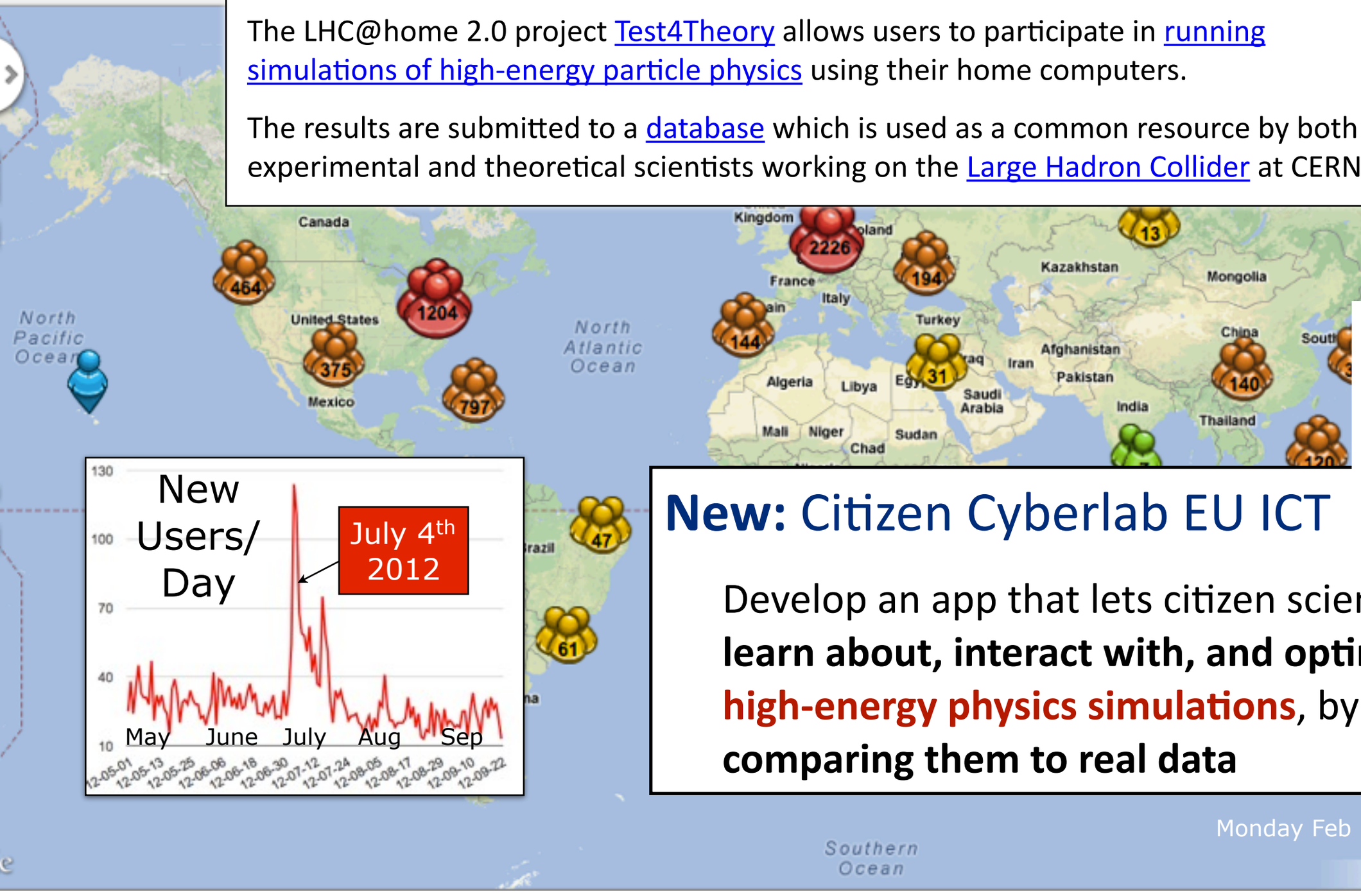


Test4Theory - LHC@home

LHC@home 2.0 Test4Theory volunteers' machines seen during the past **24** hours (7011 machines overall)

The LHC@home 2.0 project Test4Theory allows users to participate in running simulations of high-energy particle physics using their home computers.

The results are submitted to a database which is used as a common resource by both experimental and theoretical scientists working on the Large Hadron Collider at CERN.



Ioannis Charalimpidis

New: Citizen Cyberlab EU ICT

Develop an app that lets citizen scientists **learn about, interact with, and optimize high-energy physics simulations**, by **comparing them to real data**

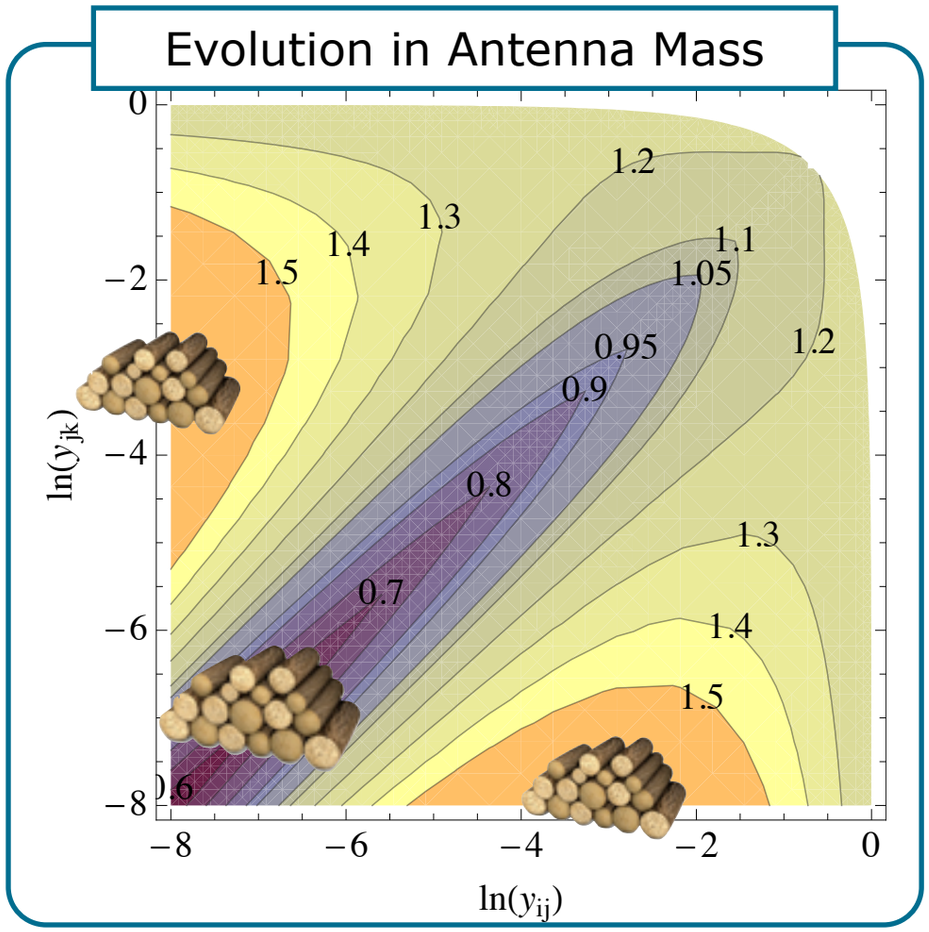
The QCD Fractal

Bremsstrahlung

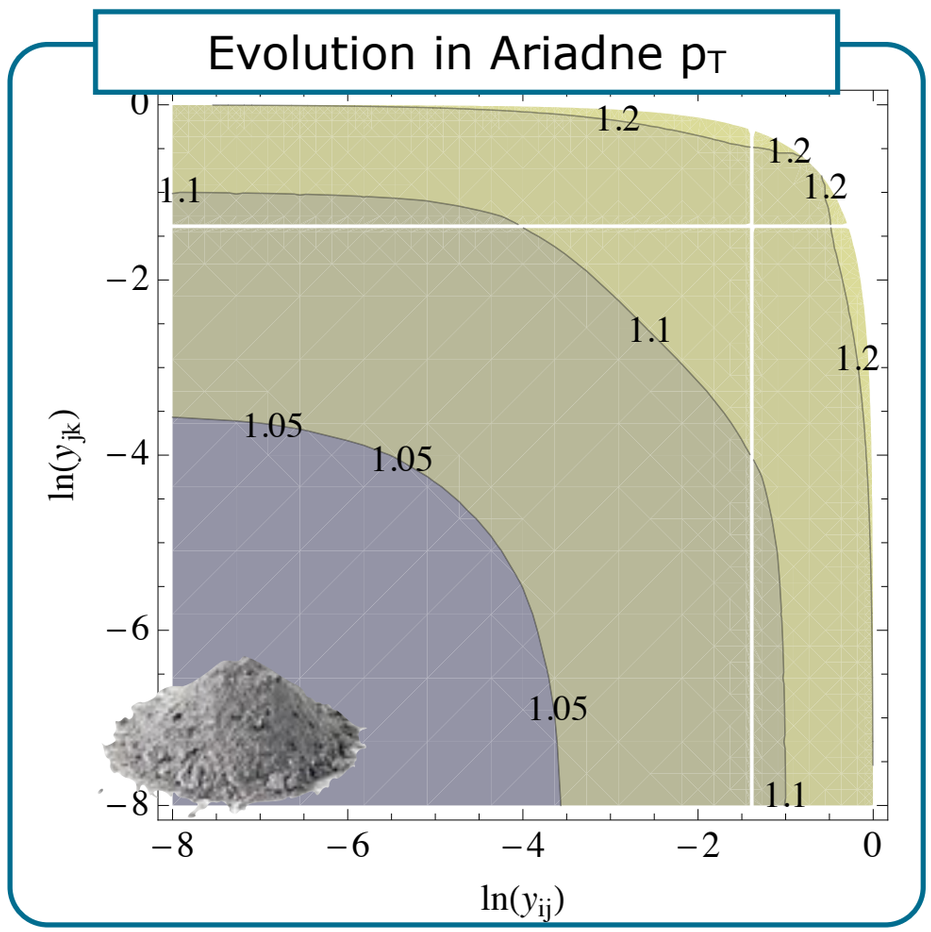
Driven by singularities of on-shell propagators

→ Quasi-scale invariant structure : parton shower

Higher-order corrections → more insight, higher accuracy



VINCIA



The QCD Fractal

Hendrik Mantler

Bremsstrahlung

Driven by singularities of on-shell propagators

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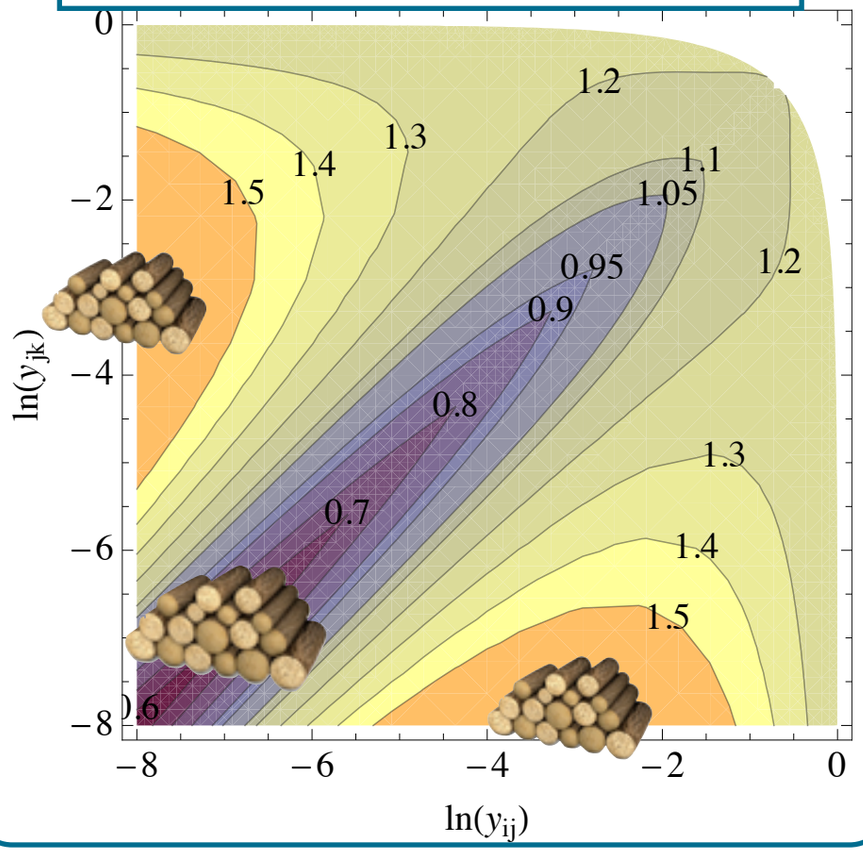
Evolution in Antenna Mass



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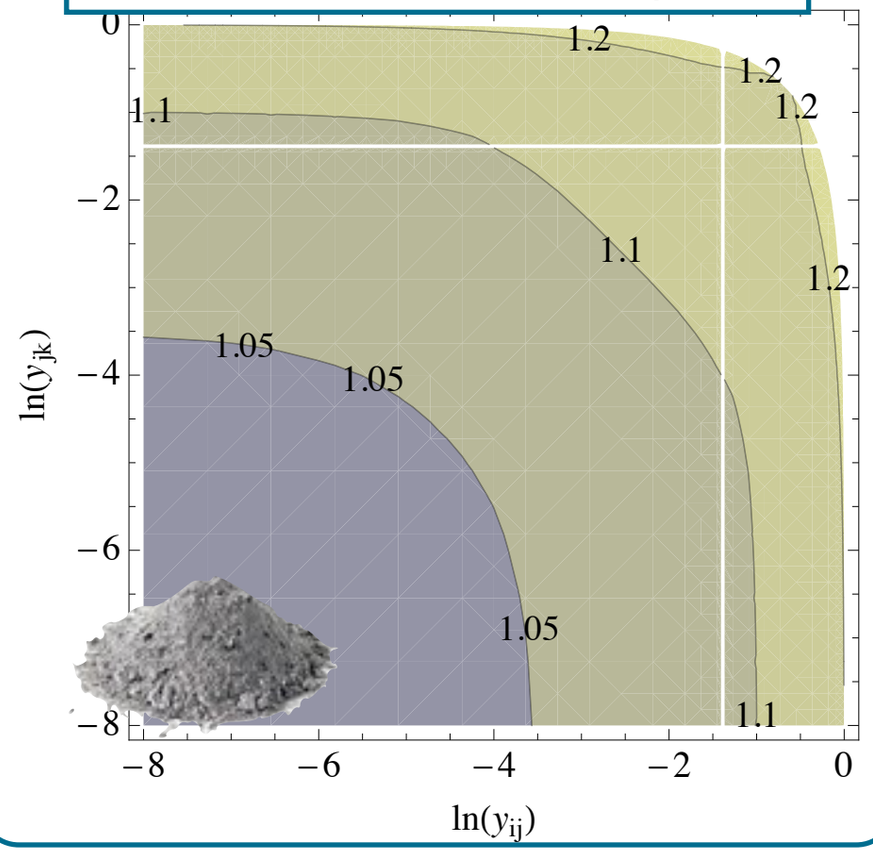
Evolution in Ariadne p_T