

Workshop goals

Andreas Jung, Purdue

Reinhard Schwienhorst, Michigan State



Theories that have been confirmed

- Existence of the top quark
- Existence of the Higgs boson and electroweak symmetry breaking

Theories that have been confirmed

- Existence of the top quark
- Existence of the Higgs boson and electroweak symmetry breaking

- Supersymmetry
- Extra dimensions
- Compositeness
- Black holes
- Little Higgs
- Vector-like quarks
- Un-particles
- Leptoquarks
- Contact interactions
- Dark matter
- Dark sector
- Heavy neutrinos

Theories that have been confirmed

- Existence of the top quark
- Existence of the Higgs boson and electroweak symmetry breaking
- ~~Supersymmetry~~
- ~~Extra dimensions~~
- ~~Compositeness~~
- ~~Black holes~~
- ~~Little Higgs~~
- ~~Vector-like quarks~~
- ~~Un-particles~~
- ~~Leptoquarks~~
- ~~Contact interactions~~
- ~~Dark matter~~
- ~~Dark sector~~
- ~~Heavy neutrinos~~

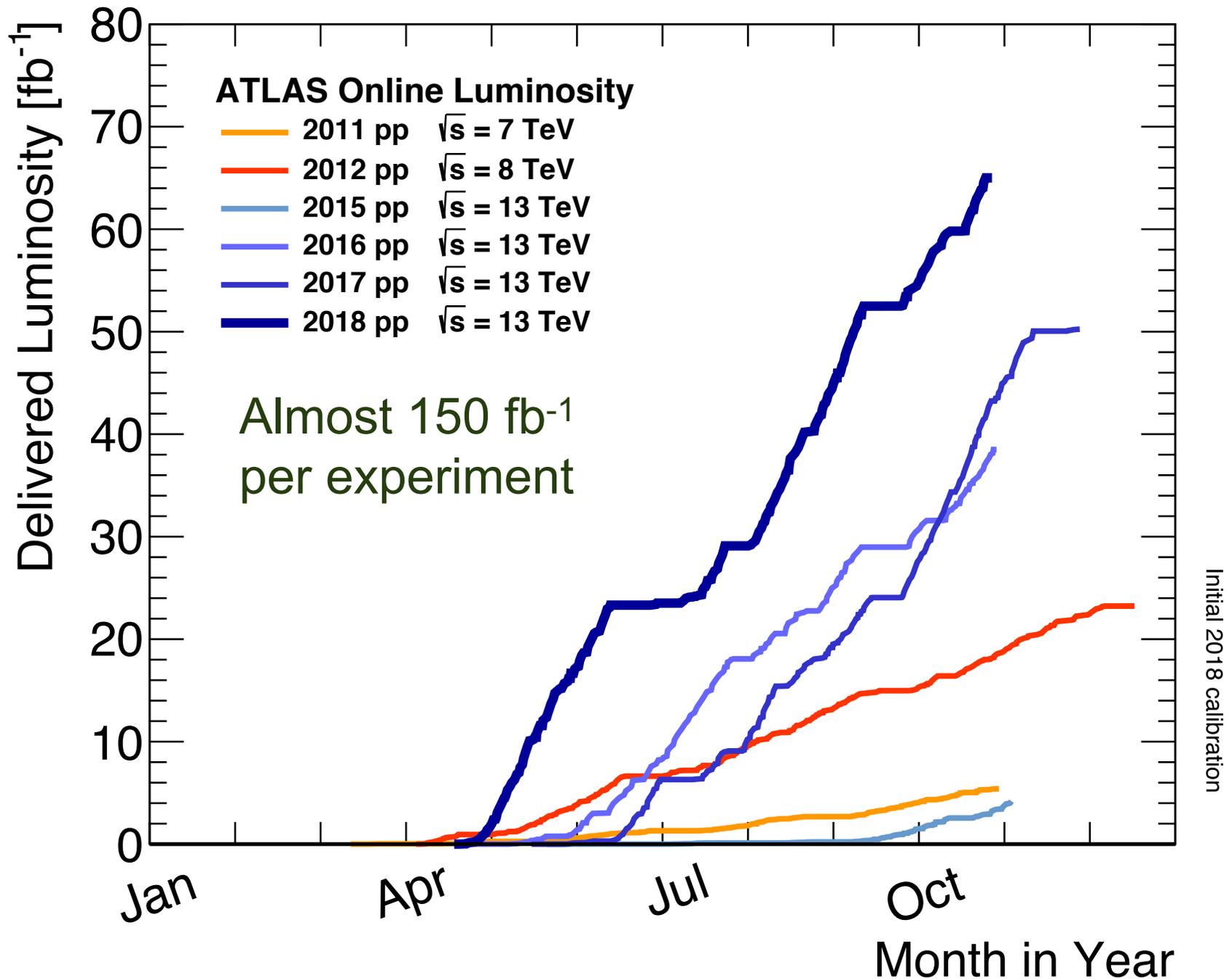
Theories that have been confirmed

- Existence of the top quark
- Existence of the Higgs boson and electroweak symmetry breaking

- ~~Supersymmetry~~
- ~~Extra dimensions~~
- ~~Compositeness~~
- ~~Black holes~~
- ~~Little Higgs~~
- ~~Vector-like quarks~~
- ~~Un-particles~~
- ~~Leptoquarks~~
- ~~Contact interactions~~
- ~~Dark matter~~
- ~~Dark sector~~
- ~~Heavy neutrinos~~

Searches for new physics will continue, but the available phase space is shrinking

LHC collisions recorded

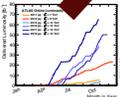


LHC collisions future

3,000 fb⁻¹ by 2035
HL-LHC

Twenty times the current dataset in 15 years

300 fb⁻¹ by 2025



LHC priorities

- Direct searches for new physics
 - Dark matter
 - Explore remaining regions of available phase space
 - New physics coupling to third generation quarks
- Precision measurements
 - Of bosons
 - Of top quark
 - Test precision of Standard Model
 - Indirect exploration of new physics
- Both require precision predictions
 - of signal and background processes

Workshop goals

- Top quark physics in North America
 - Bring together regional experts
- Discuss current state of the field
 - Precision calculations and measurements
 - Hot topics
- Learning
 - About ongoing work
 - for students - ask questions!
- Present new ideas and new measurements
 - Prospects for dealing with even larger upcoming datasets
- Bring together theorists and experimentalists
 - New Collaborations
- Spark new ideas
 - New directions