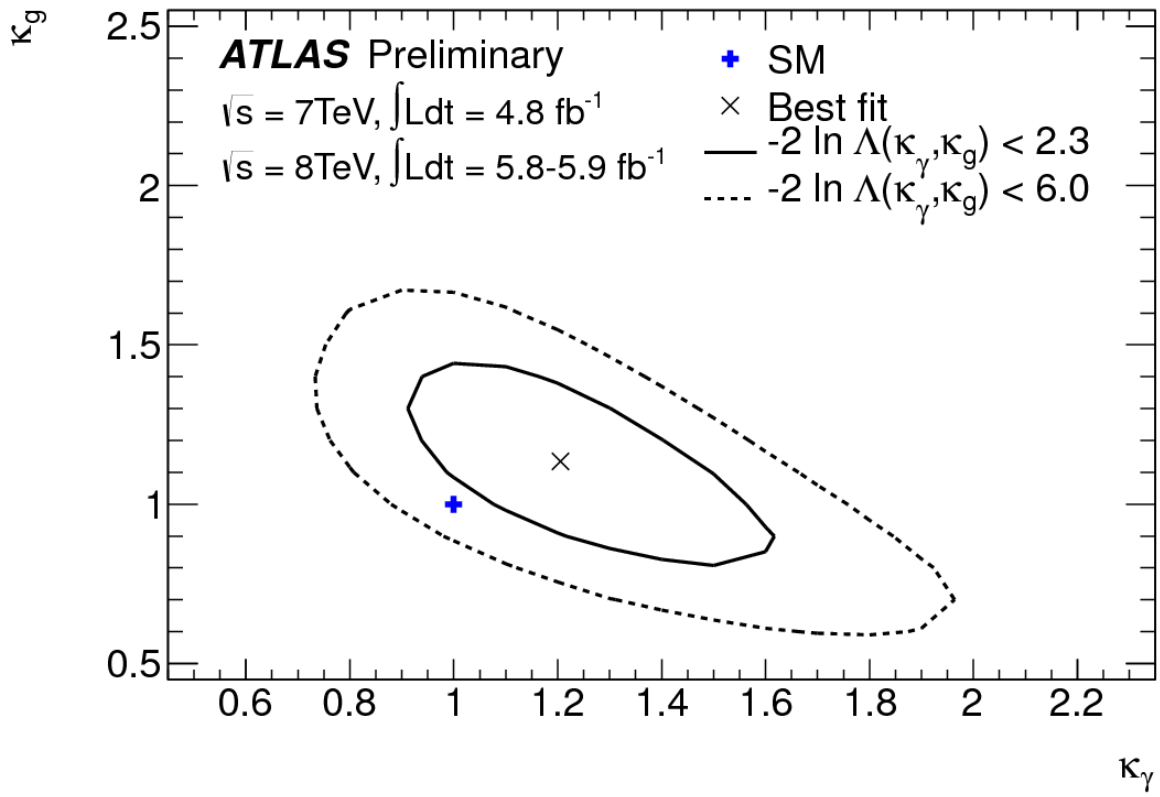
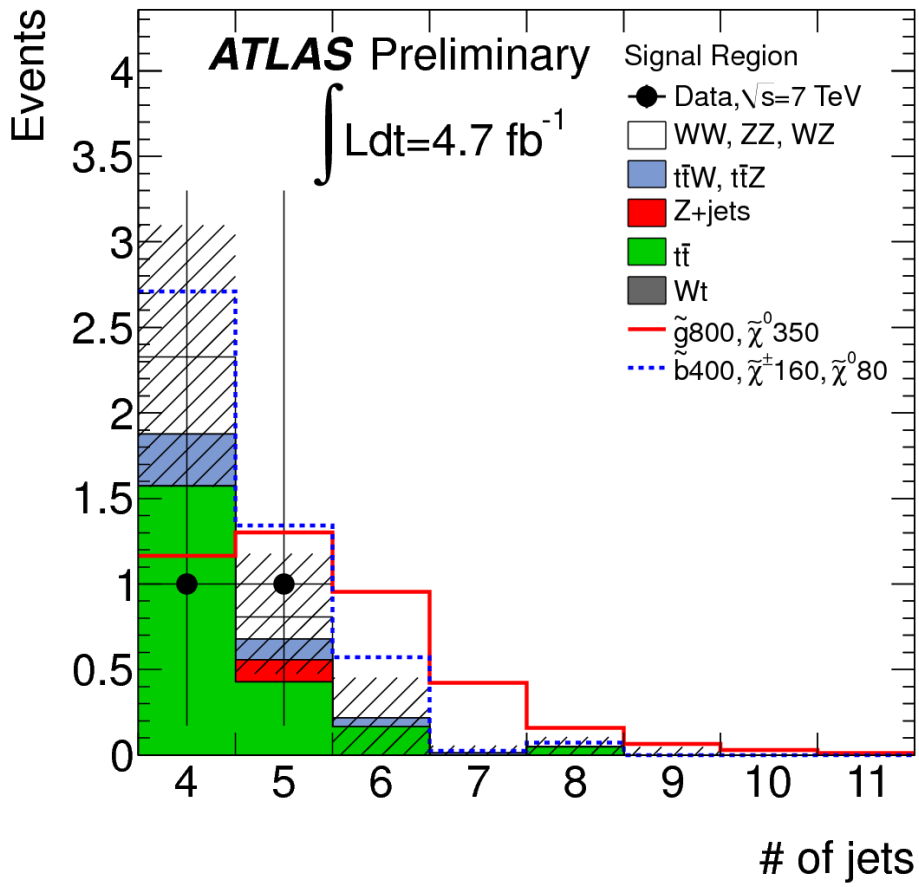


†The exciting discovery of a Higgs-like boson using LHC data was reported by the ATLAS and CMS experiments in early July. Argonne scientists working on the ATLAS experiment have now performed the first measurement of the new particle's "couplings" or strength with which it interacts with existing particles in the Standard Model. The attached figure indicates the measured couplings of the new particle to gluons (k_g) and photons (k_g), the massless carriers of the electromagnetic and strong forces respectively. The measurements (black X), which are shown as ratios to their predicted values (blue cross), are about 1.2 times larger than expected but are consistent at 95% confidence level (dashed curve). These are the first measurements of the particle's properties. The suggest that the new particle is very much like the Standard model Higgs boson, and rule out some potential models of "supersymmetry", an exotic new physical phenomenon that would produce significant deviations in the couplings. A full list of ATLAS public results and publications is available at https://twiki.cern.ch/twiki/bin/view/AtlasPublic

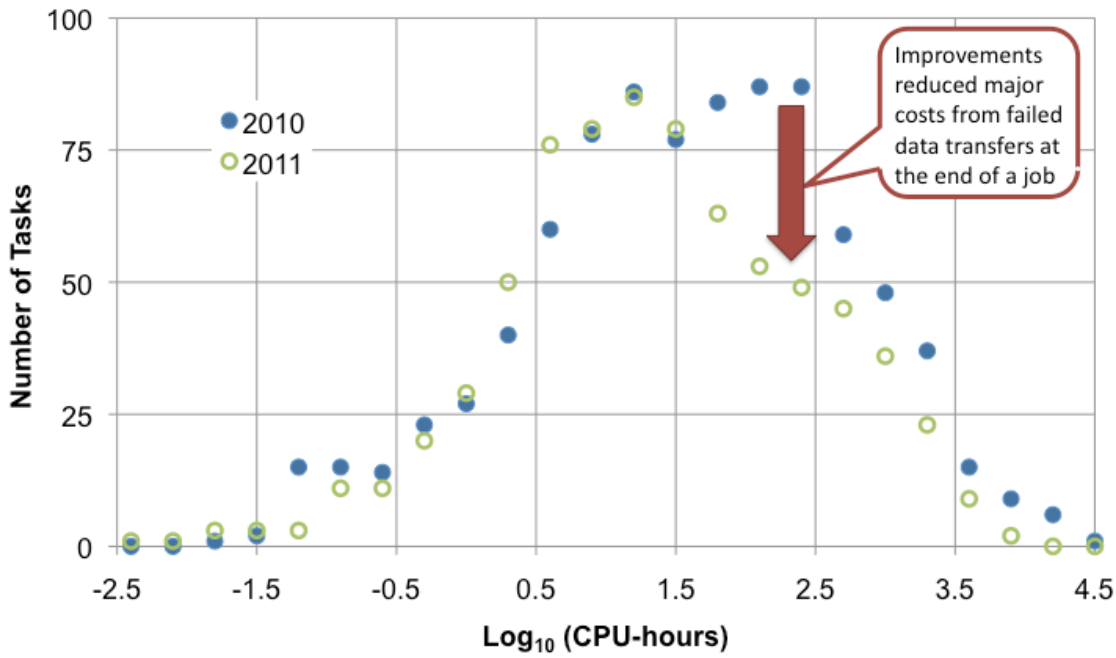
†Contributed by Eric Feng eric.feng@anl.gov



[†]The discovery of the Higgs-like boson is a great success of fundamental science. However, many of paramount questions remain unanswered. In fact, the discovery motivates searches for new elementary particles that can explain the origin of dark matter and, perhaps, allow unification of strong and electroweak interactions. The new particles are expected to be light, within the reach of the experiments at the Large Hadron Collider. In collaboration with physicists from the University of Chicago and Duke University, Argonne Scientists are conducting a search for these particles in proton-proton collisions at 7 TeV recorded by the ATLAS detector in 2011. The new physics is expected to manifest itself as a discrepancy between data and theory predictions in the distribution in multiplicity of jets, collimated group of particles. The distributions for data, predictions, and new physics are shown in the figure. Alas, the data is in agreement with the predictions. This implies that the new particles have to be more massive than 700 protons. Currently we are focussing on analyzing data from proton-proton collisions at 8 TeV observed in 2012, which are expected to provide more sensitivity to possible new physics. A full list of ATLAS public results and publications is available at https://twiki.cern.ch/twiki/bin/view/AtlasPublic

[†]Contributed by Sasha Paramonov aparamonov@hep.anl.gov

PanDA is a workload management system built on top of the petascale data store and grid computing technologies developed at Argonne. In petascale data processing scientists deal not with individual files, but with big data sets comprised of thousands of files. Splitting large data processing task into jobs enables fine-granularity checkpointing similar to a file splitting into small packets during network transfers. Failure recovery by re-tries limits data losses below 10^{-8} level in petascale data processing on the grid. It takes few percent of the total data processing time to recover failures in petascale data processing on the grid.



Weibull distribution of CPU-hours used to recover job failures in petascale data processing.

Press Release from BNL:
http://www.bnl.gov/newsroom/news.php?a=1&b=1451

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