**Early Measurements from the Large Hadron Collider Depend on the**

**Distributed Computing Contributions of the Open Science Grid**

The Open Science Grid (with more than 80 laboratory and university sites in the US) is a core part of the ATLAS and CMS experiments distributed computing facility, as part of the World Wide LHC Computing Grid (with more than 200 laboratory and university sites). In November and December 2009 the LHC delivered over a million collision to the four detectors at an energies of 900 GeV, and ~2,500 GeV. The readiness of the worldwide distributed systems, with OSG delivering more than 30% of the total throughput, has allowed more than 500 users of the facility (as measured by the OSG itself) to make early measurements crucial to the understanding of the detector and data to already be available, with first publications imminent – a significant advance on the timeline of previous large HEP experiments.

The OSG’s unique collaboration between the experiments and computer scientists made possible through DOE ASCR’s support has enabled the fruition of major contributions in more effective data and job throughput capabilities, transparency across the “federated” US and EU facilities, and implementation of fundamental distributed computing concepts. Two examples are: the adoption by the European Union that the federated model of independent cooperating infrastructures in different regions, implemented over the past decade by the OSG and its collaborators; proof of the effectiveness of “resource overlay” job management technologies included in the OSG software stack, that allow transparent use of heterogeneous compute clusters as a uniform distributed facility.

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| pt7__AntiKt4_H1TopoReReco_dphi.gif  Angular distribution of Events with two jets with pT> 7 GeV (Courtesy of ATLAS [publicly available plots](https://twiki.cern.ch/twiki/bin/view/Atlas/AtlasResults) ) | First physics distributions: The green band represents the measurement uncertainty (Courtesy [Fermilab Today](http://www.fnal.gov/pub/today/archive_2010/today10-01-08.html), Don Lincoln,) |

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| pt7__AntiKt4_H1TopoReReco_pt.gif  Alternate possible ATLAS Plot: Distribution of the Jet (multiple particle) Events transverse momentum. |  |