



# ALICE-USA O<sup>2</sup>-related Activities

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21 January 2014

# ALICE-USA O<sup>2</sup> Update

- Today follows the ALICE-USA O<sup>2</sup> “Kickoff Meeting” on 28 October 2013.
- Notable background:
  - Kickoff: <https://indico.cern.ch/conferenceDisplay.py?confId=280170>
  - ALICE O<sup>2</sup> Twiki: <https://twiki.cern.ch/twiki/bin/viewauth/ALICE/AliceO2>
  - Wuhan link: <https://indico.cern.ch/conferenceDisplay.py?confId=272827>
  - This morning: <https://indico.cern.ch/conferenceDisplay.py?confId=292082>
- Need to *focus* visible ALICE-USA contribution.
- Multiple ALICE-USA institutes interested in these ongoing O<sup>2</sup> groups:
  - CWG 6 (Calibration)
  - CWG 7 (Reconstruction)
  - CWG 8 (Physics Simulation)
- Also, Creighton interested in CWG 10 (Controls).
- Also, ORNL participating in CWG5 (Platforms) in 2014.
- Updates from ORNL, UT, LBL, Houston, Wayne State (at least) today.
- Plus, questions and discussion.



# O<sup>2</sup> CWG 6: Calibration

- Multiple ALICE-USA institutes interested.
- C. Pruneau (Wayne State) very interested, had planned to attend today, and briefly describe plans to start.
- Wayne State and Univ. Houston specifically expressed interested in participating in CWG 6 and hope to start soon.
- Need to get such US teams integrated, attending meetings, and contributing to early tests, benchmarking, etc.
- Will follow up on this at the [ALICE-USA Collaboration Meeting @ ORNL](#) on 28 February and 1 March.
- Others will comment today during next presentations and discussion.



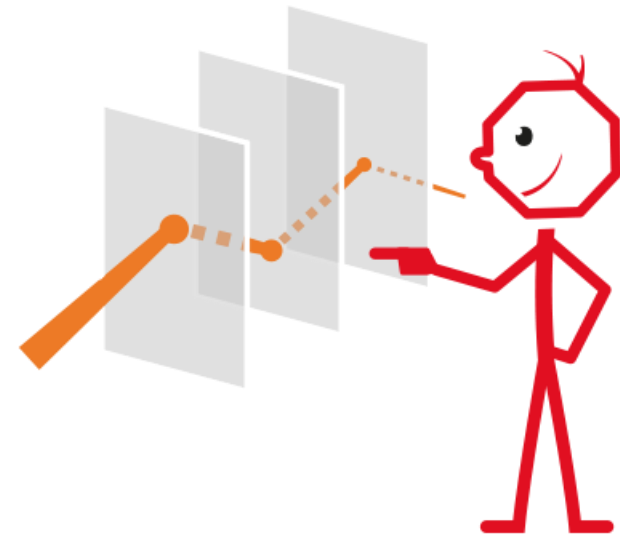
# O<sup>2</sup> CWG 7: Reconstruction

- Multiple ALICE-USA groups interested.
- Univ. Houston (including Anthony Timmins) specifically expressed interest.
- Need to get US teams integrated, attending meetings, and contributing to early tests and benchmarking.
- Again, expect to have more concrete details by ALICE-USA Collaboration meeting as discussions continue.



# O<sup>2</sup> CWG 8: Physics Simulations

- See CWG 8 outlook summary from Wuhan here: <https://indico.cern.ch/getFile.py/access?contribId=11&resId=0&materialId=slides&confId=272827>
- ORNL, Univ. Tennessee, Houston, and others *definitely* interested. Some relevant work underway with *much* more to come.
- Broad expertise within ALICE-USA for testing, benchmarking AliROOT, profiling Geant4, and Grid expertise.
- Significant present *and future* computing resources from ALICE-USA can contribute to simulation production in the O<sup>2</sup> era.





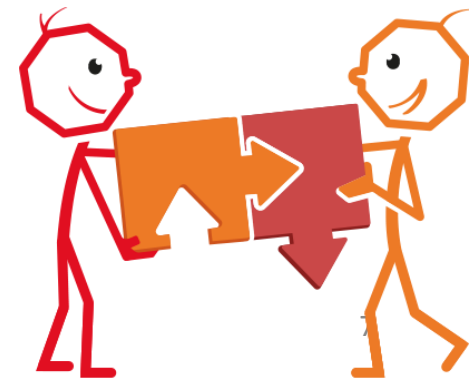
O<sup>2</sup>-related Activities @ ORNL & Univ. Tennessee

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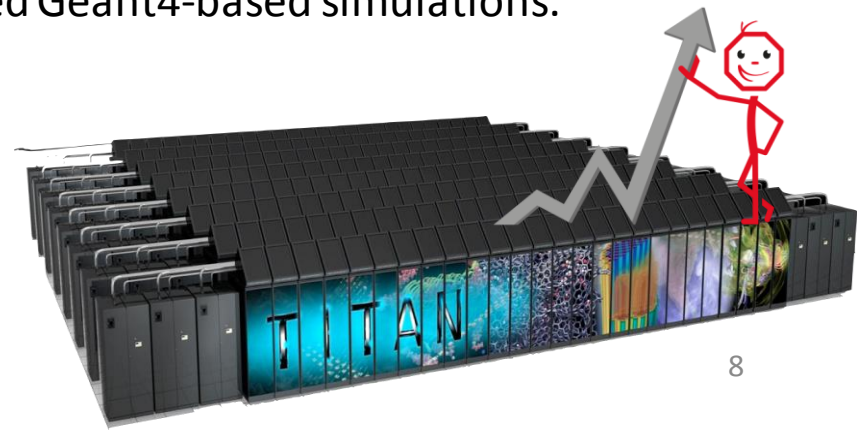
# O<sup>2</sup> @ Tennessee

- OLCF postdoc with computer science Ph.D. in GPU computing and profiling/optimization (perfect for O<sup>2</sup>) starts on 1 March 2014.
- Tom, Ken, others preparing an O<sup>2</sup>-related ORNL Laboratory Directed Research and Development (LDRD) Proposal.
- OLCF has definitely expressed interest in facilitating advanced/intensive ALICE Computing. Extensive cycles and manpower assistance provided in 2013.
- Titan parasitic cycles available via PanDA.
- Potentially dedicated AliEn cycles for ALICE Offline available via new OLCF CADES HPC facility (under active discussion).
- Ken member of O<sup>2</sup> TDR Editorial Committee.
- Local convergence of ALICE ORNL & UT physics teams + large advanced computing facilities + expertise in hardware acceleration/optimization + strong vendor support (NVIDIA, Intel, ...).



# O<sup>2</sup> CWG 8: Physics Simulations

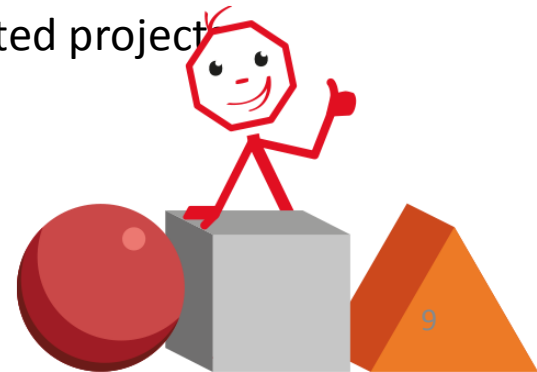
- Participation and possible activities discussed with Andreas Morsch and Ivana H. See outlook here:  
<https://indico.cern.ch/getFile.py/access?contribId=11&resId=0&materialId=slides&confId=272827>
- Significant local Geant4-related projects:
  - nEDM Experiment uses parallel-Geant4 simulation
  - SNS shielding design exploring transition to Geant4
  - Multiple meetings and projects over the past year with Geant4 Steering Board and SLAC development team
  - *Multi-threaded* Geant4 simulations being implemented as a “PanDA payload” on Titan
- Experience running AliRoot with Geant4 (and Geant3) with advice from Ivana Hrivnacova (Virtual Monte Carlo expert) relevant to present CWG8 “profiling”.
- Interest in developing/testing multi-threaded Geant4-based simulations.





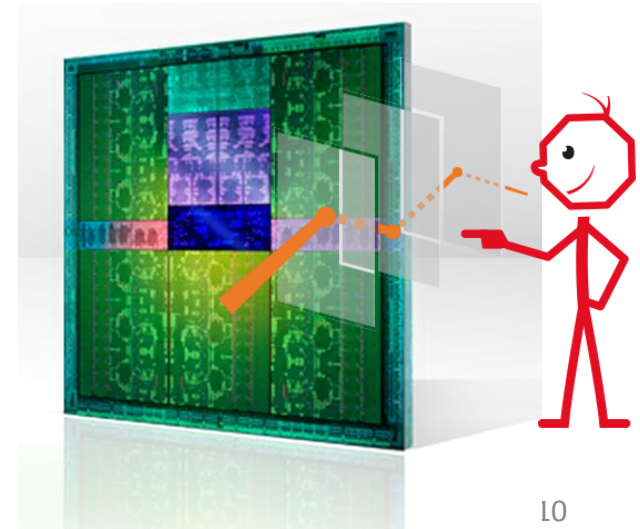
# O<sup>2</sup> CWG 5: Computing Platforms

- Helped develop draft CWG5 Milestone Report for Wuhan:
  - <https://indico.cern.ch/conferenceDisplay.py?confId=272827>
  - <https://indico.cern.ch/getFile.py/accesscontribId=3&resId=0&materialId=0&confId=272827>
- Local resources:
  - Experience with parallel programming (CUDA, OpenCL, OpenMP, OpenACC) and parallel performance profiling/optimization
  - New OLCF postdoc in “Computational High Energy Nuclear Physics” with Ph.D. in GPU computing and performance optimization
  - Local engineers: NVIDIA, CRAY, member of international standards OpenMP Architecture Review Board, ...
  - Available NVIDIA GPUs and Intel Xeon Phi coprocessors
  - Incidentally, already great local collaboration with Frankfurt Institute of Advanced Studies on *non-ALICE* heavy-ion GPU-accelerated project
    - <https://sites.google.com/site/openclshasta/>
    - <https://sites.google.com/site/cjetsite/>



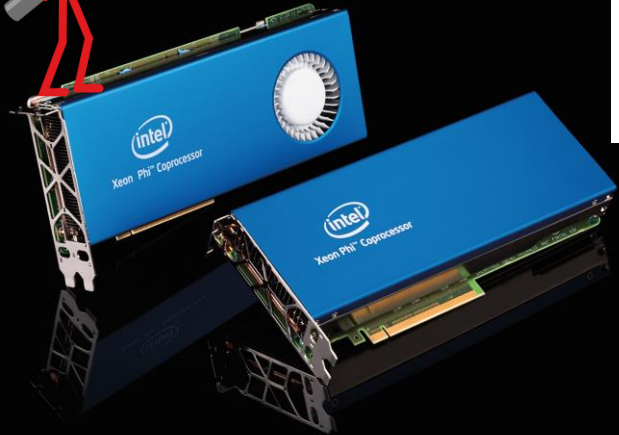
# NVIDIA @ ORNL

- Local NVIDIA engineer has already helped (for free) with edits for the CWG5 Milestone Report.
- NVIDIA contacts are potentially a *great resource* for O<sup>2</sup> benchmarking and design.



# Intel @ Univ. Tennessee

- Invited to submit proposal to Intel Parallel Computing Center at University of Tennessee from the director of the Univ. Tennessee Joint Institute for Computational Sciences (located on ORNL campus).
- Great resource, including access to hardware and engineers concerning Intel Xeon Phi coprocessors for O<sup>2</sup> testing and development.
- <http://software.intel.com/en-us/articles/intel-parallel-computing-center-at-university-of-tennessee>



A screenshot of the Intel Developer Zone website. The page title is "Intel® Parallel Computing Center at University of Tennessee". It was submitted by THOMAS C. (Intel) on Fri, 10/18/2013 - 07:59. The page features the University of Tennessee logo (UT) and social media icons for Facebook, LinkedIn, and Twitter. The navigation bar includes "Development", "Tools", and "Resources". A search bar is present with the text "What can we help you find today?".