@GridPP @twhyntie

Other VOs: Review and Plans

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#GridPP32, Pitlochry, Scotland

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GridPP
UK Computing for Particle Physics

Queen Mary
University of London

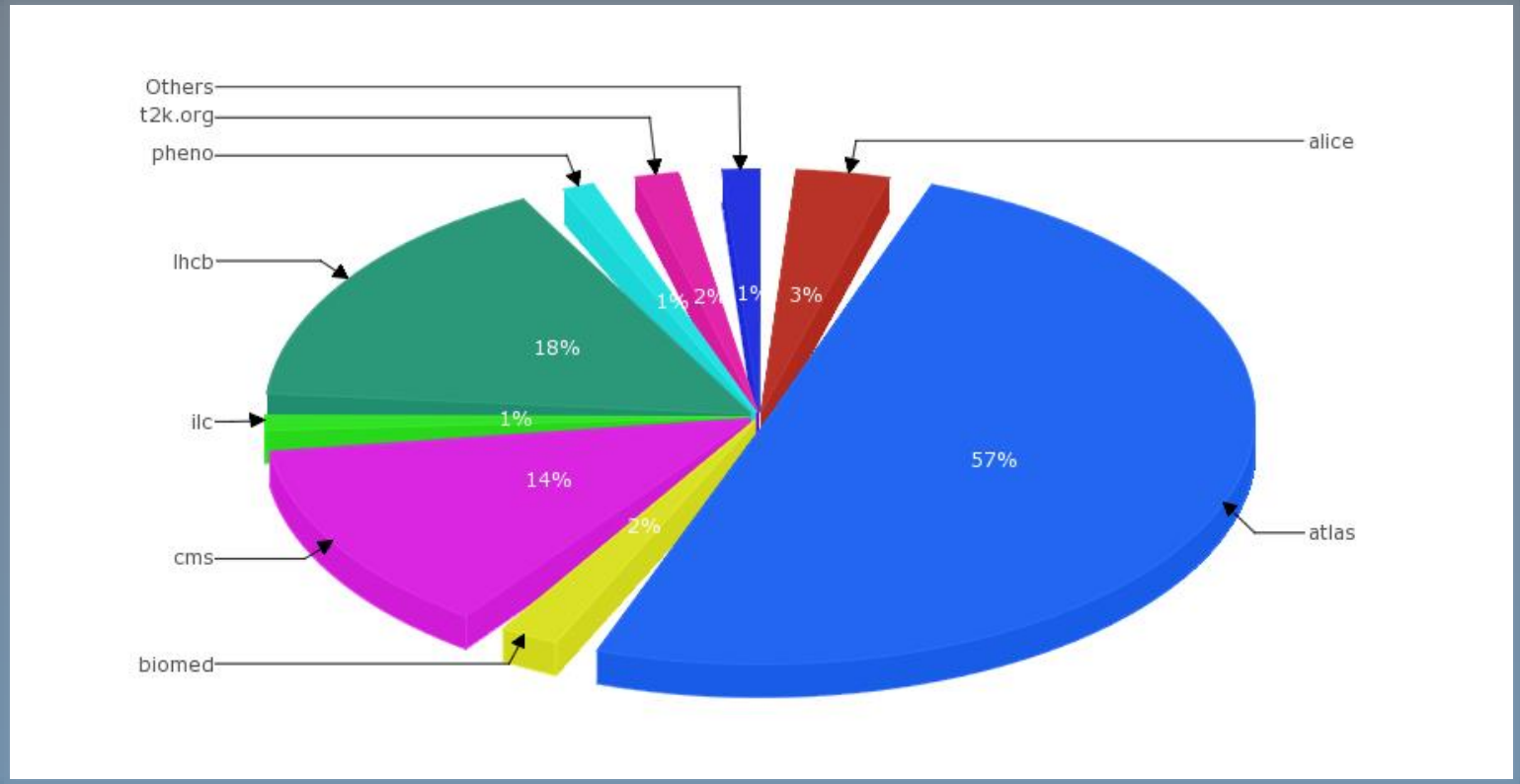
Other VOs: Review and Plans

- Review of “other” VO activities:
  - *Usage statistics;*
  - *Selected VOs – reviews and plans*
- Common themes:
  - *Tools used;*
  - *Issues encountered;*
  - *General requests.*

Review of “other” VO activities

Usage statistics; selected VOs – reviews and plans.

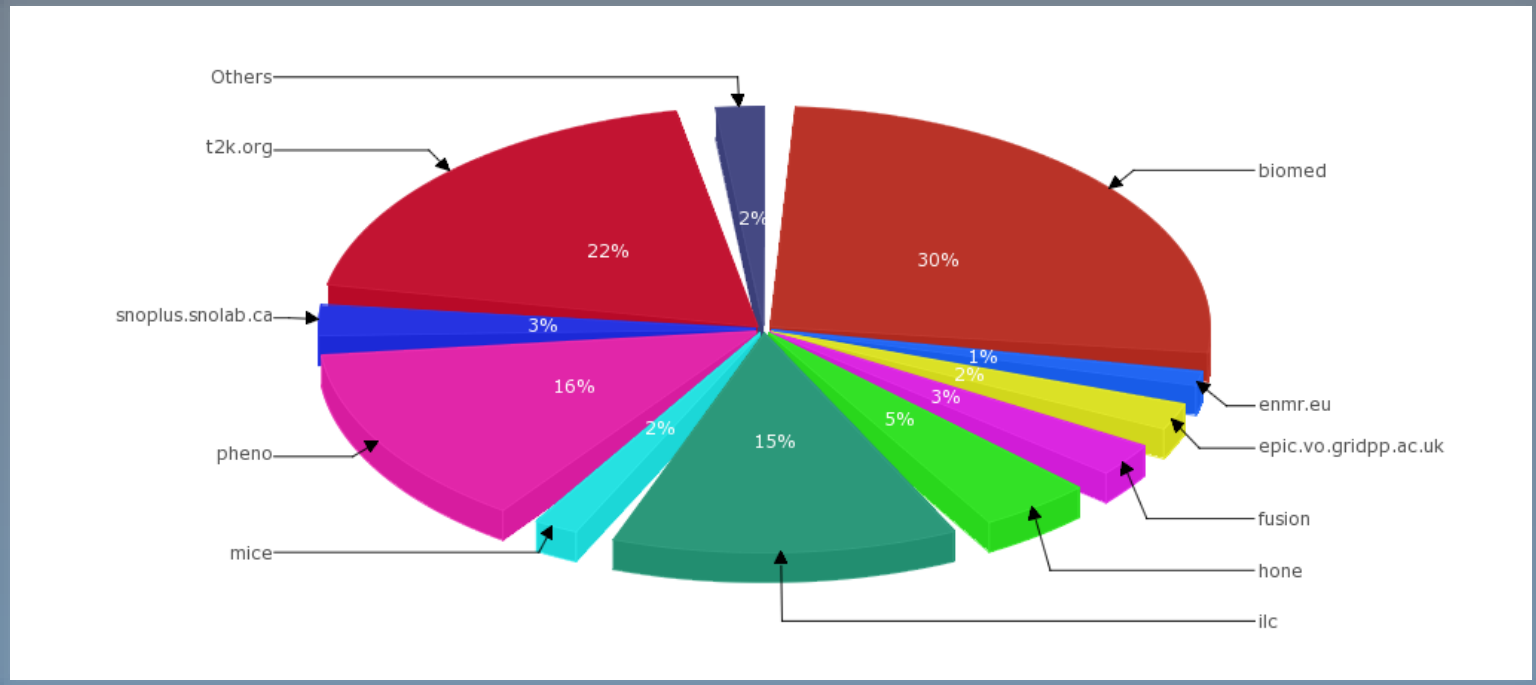
Usage statistics



~256.0M in all.

NGI_UK: Normalised CPU time (kSI2K) per VO (all VOs except dteam and ops VOs) – Oct' 2013 to Mar' 2014

Usage statistics

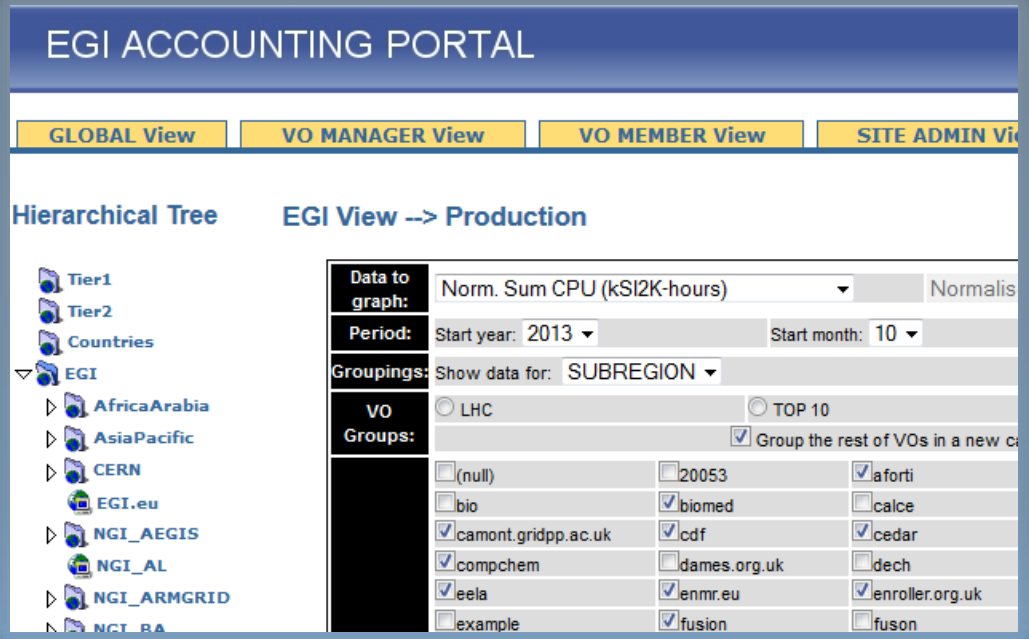


~19.0M in all. (7.4%)

NGI_UK: Normalised CPU time (kSI2K) per VO (other VOs only) – Oct' 2013 to Mar' 2014.

Usage statistics

- Create your own!
  - http://accounting.egi.eu
- Site support for VOs:
  - http://pprc.qmul.ac.uk/~walker/votable.html



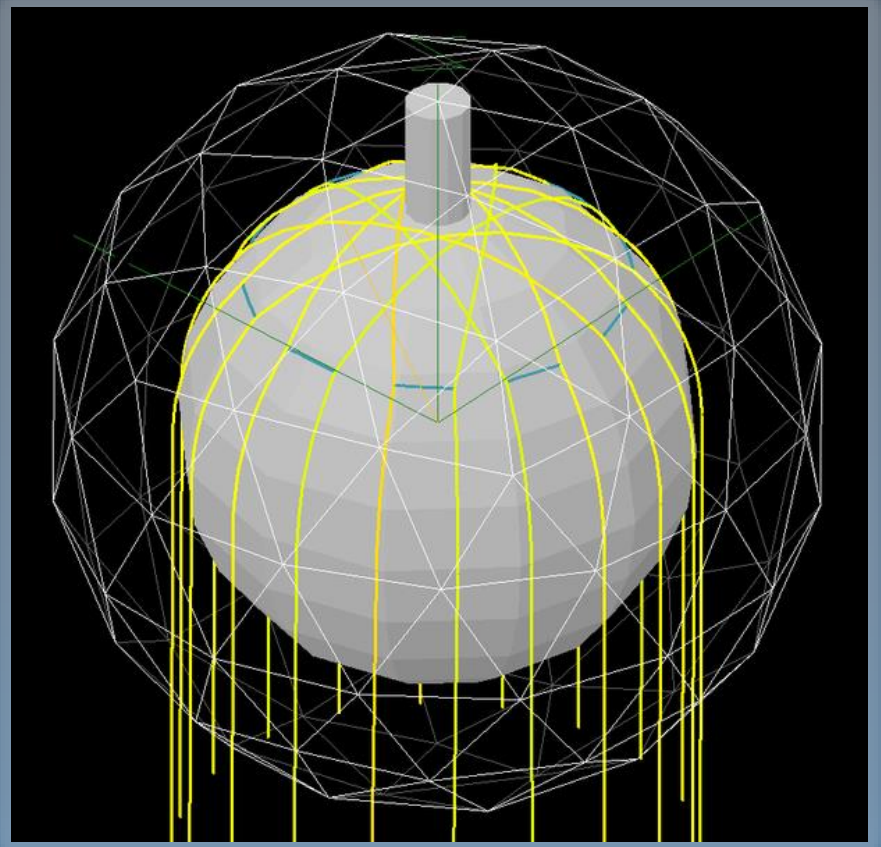
VO	JET	RAL	Bru	IC	QMUL	RHUL	UCL	Lancs	Liv	Man	Shef
alice	Y	Y	Y	N	N	N	N	Y	Y	N	Y
atlas	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
biomed	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
calice	N	N	N	Y	N	Y	N	N	Y	N	N
camont	N	N	Y	Y	Y	N	N	Y	Y	N	Y
cdf	N	N	N	N	N	N	N	N	Y	N	N
cedar	N	N	Y	N	N	N	N	N	N	N	N
cernatschool.org	N	N	N	N	Y	N	N	N	Y	N	N
cms	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y
comet.j-parc.jp	N	N	N	Y	N	N	N	N	N	N	N
compchem	N	N	N	N	N	N	N	N	N	N	N
dames.org.uk	N	N	N	N	N	N	N	N	N	N	N
dteam	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Selected VOs

- (T2K – see J. Perkin's talk)
- (NA62 – see D. Protopopescu's talk)
- (MICE – see CHEP '13 poster "MICE Data Handling on the Grid".)
- SNO+
  - *The successor to the SNO experiment, using a liquid scintillator.*
- CERN@school
  - *Bringing CERN – and now the grid - into the classroom.*
- EPIC
  - *Simulating the spread of bovine tuberculosis (bTB) with the grid.*

SNO+ - snoplus.snolab.ca

- Using a liquid scintillator - linear alkyl benzene (LAB) - at SNO instead of heavy water.
  - *Full operation in early 2014.*
- Recent activity:
  - *Three full rounds of production;*
  - *Supported by 6 sites (LIV, OXF, QML, RAL, SHF, SUS);*
  - *Contact: Matt Mottram (SUS).*



SNO+ - tools, issues, plans, feedback

- Tools used:
  - *WMS;*
  - *LFC (though custom file catalogue also used for production);*
  - *Ganga (to assist with job submission).*
- Issues:
  - *WMS throughput - trouble with hundreds of concurrent jobs from one site;*
  - *DiRAC - support offered by ICL but lacked mains d'œuvre to test/commission.*
- Future plans:
  - *Use CVMFS for SNO+ software (now approved by the SNO+ Collaboration);*
  - *Run at more sites.*
- General feedback:
  - *Very happy with the support received - many thanks!*

CERN@school – cernatschool.org

- Programme bringing CERN into the classroom:
  - *Created at the Langton Star Centre (Simon Langton Grammar School for Boys, Kent, UK);*
  - *Detector, analysis tools and educational resources to offer school students research opportunities;*
  - *The Langton Ultimate Cosmic ray Intensity Detector (LUCID) launching May 2014;*
  - *Funding from STFC, Royal Commission for the Exhibition of 1851. Support from SEPnet, IOP;*
- Other 50% of my time:
  - *The cernatschool.org VO – supporting school students using the grid for research.*

CERN & Society

CERN@school

Inspiring the next generation of scientists and engineers

Welcome to CERN@school!

CERN@school is a programme for school students - and driven by school students - that brings technology from CERN into the classroom to inspire the next generation of scientists and engineers. In the UK, CERN@school is supported by a grant from the STFC Public Engagement Large Awards scheme (read more here).

To find out more about CERN@school, click on one of the menu tabs above. To get started with your detector, click here; to get started with the DAQMAP, click here; to get a CERN Lightweight user account, click

Science & Technology Facilities Council

CERN@school in the UK is supported by the STFC's Science in Society Large Award scheme.

Get started!

Attenuation of beta radiation by aluminium

How does the thickness of a sheet of aluminium affect the passage of beta radiation? By using the Timepix detector to measure the properties of electrons that pass through small panels of aluminium, the quantitative relationship between the number of electrons detected and the thickness of the aluminium can be investigated.

Experimental arrangement for investigating the attenuation of beta radiation with a radioactive source.

Experiments

Radiation Around You (RAY)

The Inverse Square Law

Attenuation of beta radiation

Radiation Profiles

Search CERN@school

Search

Science & Technology Facilities Council

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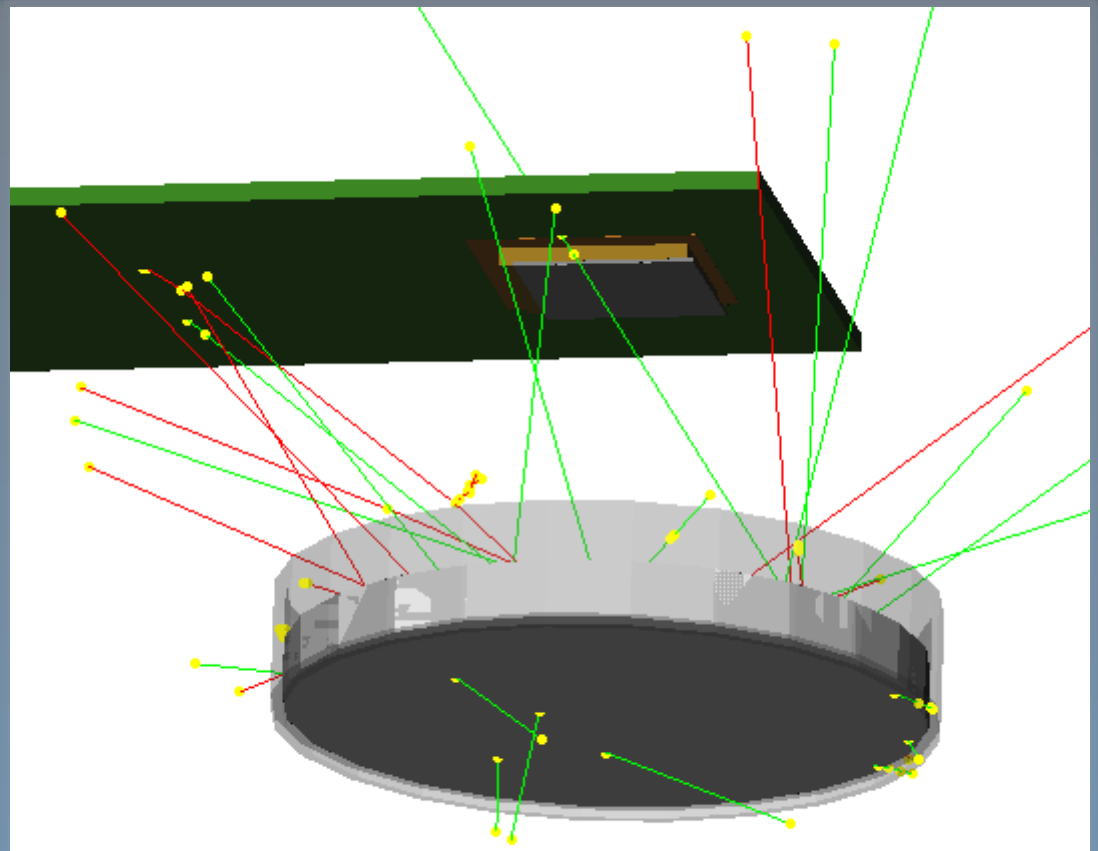
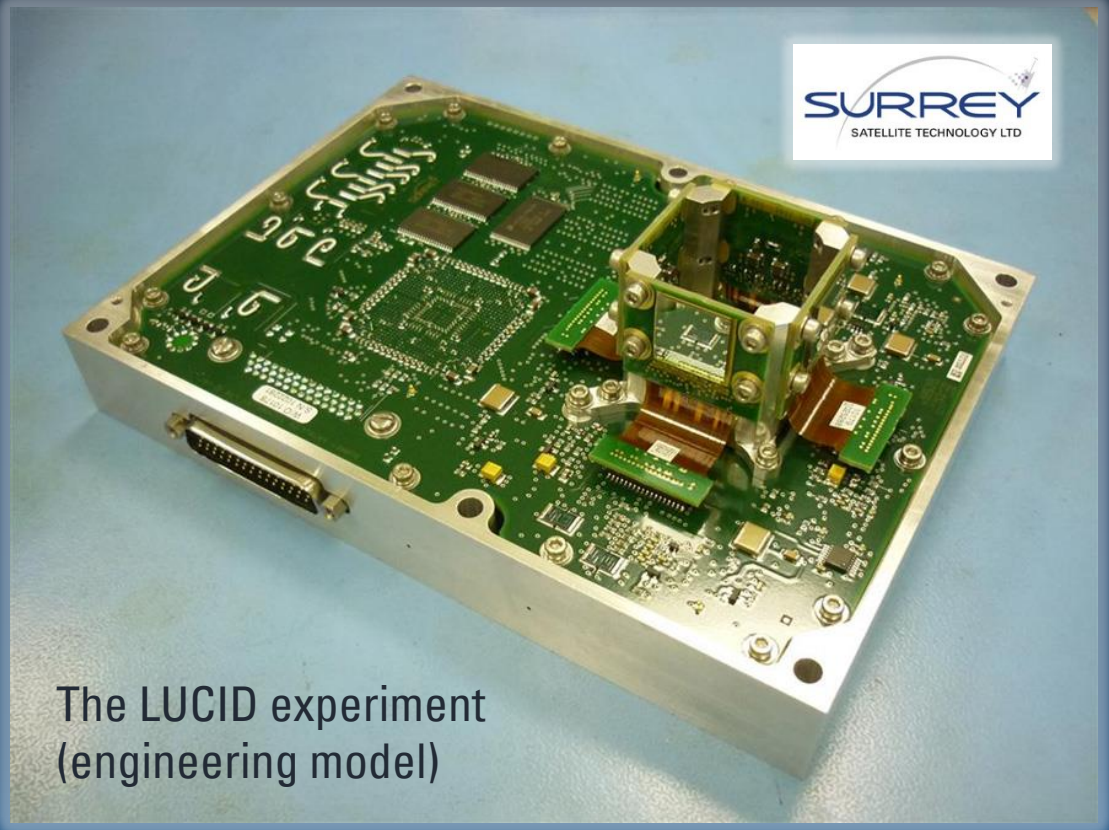
CERN@school – recent activity

- The focus of CERN@school is the Timepix hybrid silicon pixel detector (Medipix Collaboration):
  - *In-school detector kits;*
  - *Five in the LUCID experiment.*
- John Idarraga (Medipix, CERN) has developed the Allpix simulation toolkit using GEANT4:
  - *Generic app for pixel detectors;*
  - *Used by CERN@school to model both school-based kits and LUCID.*

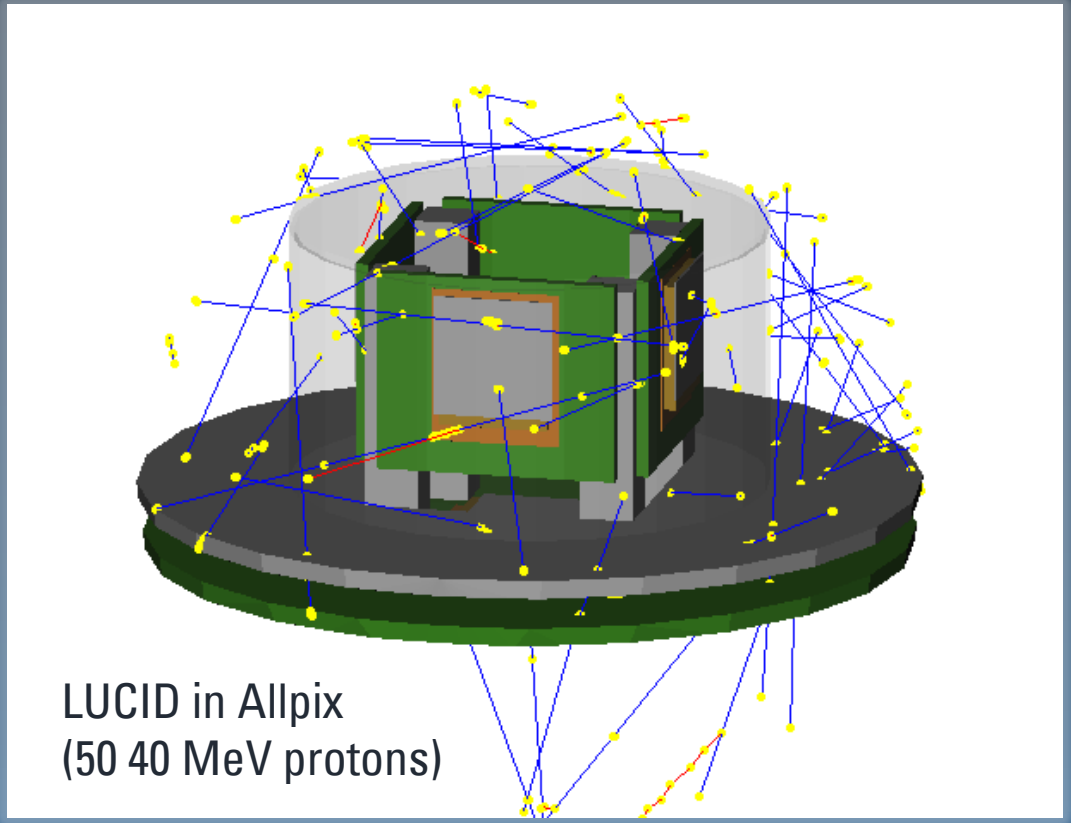


The Timepix detector measuring K-40 decays.

CERN@school – recent activity

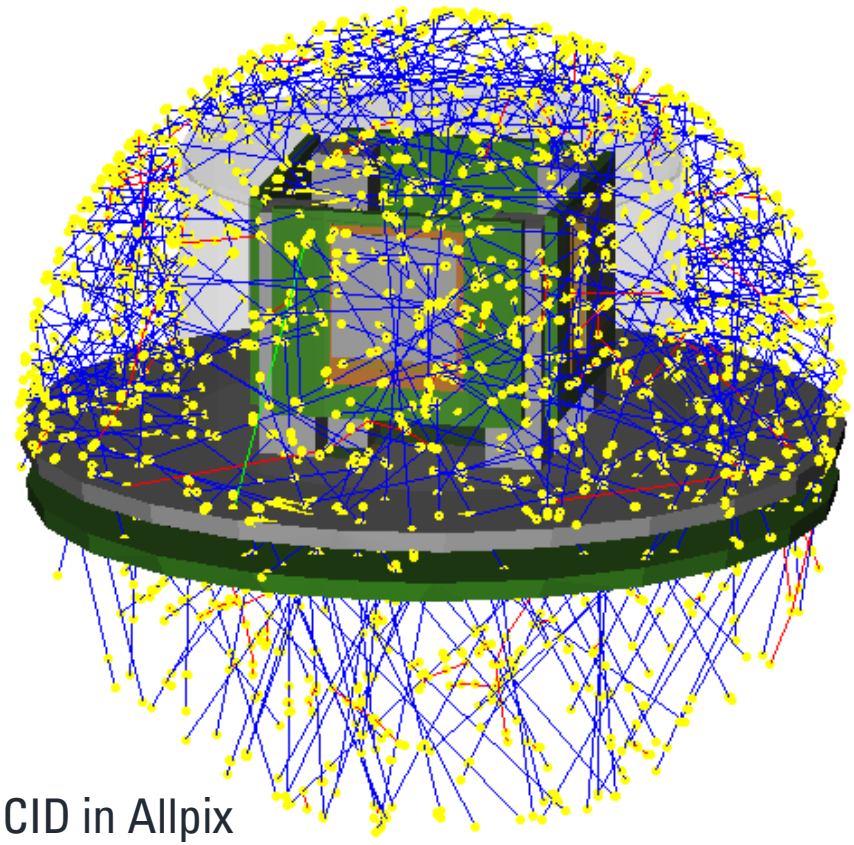


The LUCID experiment
(engineering model)

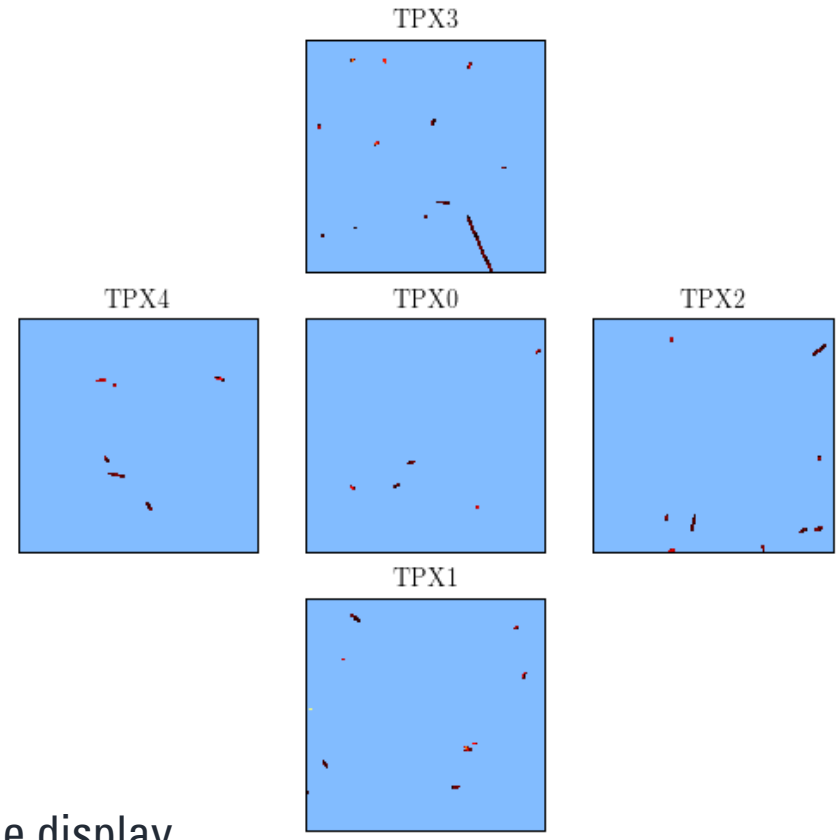


LUCID in Allpix
(50 40 MeV protons)

CERN@school – recent activity

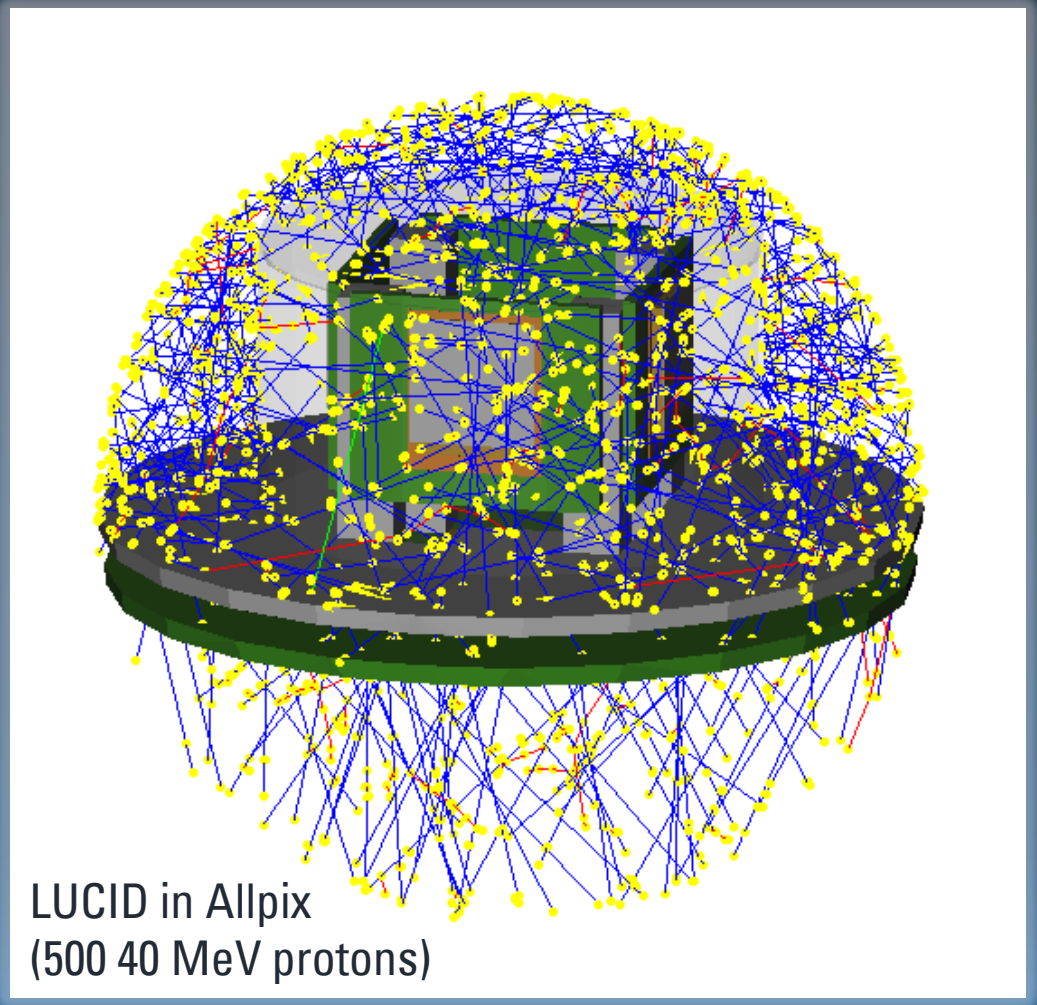


LUCID in Allpix
(500 40 MeV protons)



Frame display
(500 40 MeV protons)

CERN@school – recent activity



LUCID in Allpix
(500 40 MeV protons)

- Allpix has been configured to run on the grid!
  - *Tarball created and uploaded with RAL Stratum-0 uploader;*
  - *Deployed using CVMFS;*
  - *Supported by BIR, GLA, LIV, QML;*
  - *Also runs on QML local cluster (with same CVMFS deployment);*
  - *Invaluable support from RAL – thanks!*
- More detail tomorrow.

CERN@school – tools used

- WMS, LFC:
  - *Job submission and data cataloguing.*
- instantUI:
  - *Job submission from anywhere – so far tested with CERN VMs.*
- CVMFS:
  - *Thanks to support from RAL, we have deployed Allpix with CVMFS;*
  - *Jobs run on supported sites and on local QML cluster.*
- Custom tools - LUCIDITY:
  - *Grid job and user management system – Ruby on Rails app (based on Hobo);*
  - *Used to convert SPENVIS (Space Environment Information System - ESA) source particle/orbit information into GEANT4 macros for grid submission.*

CERN@school – issues, plans, feedback

- Issues:
  - *Reluctant to move to full-scale production runs until we can track data;*
  - *Ideally integrate the job submission (Ganga?);*
  - *User management - issuing school students with grid certificates?*
- Future plans:
  - *Implement a metadata database to allow tracking/management of production and analysis jobs from the outset;*
  - *Develop the web portal to integrate grid identities, job submission and metadata management.*
- General feedback:
  - *The support from the GridPP team has been fantastic, particularly Chris W and Catalin C with respect to resolving our GGUS tickets. Many thanks!*

EPIC - epic.vo.gridpp.ac.uk

- Tom Doherty (University of Glasgow):
  - *Institute of Biodiversity Animal Health and Comparative Medicine;*
  - *Modelling the spread of bovine diseases;*
  - *Conducting work for Defra (UK-wide) and EPIC (Scotland).*
- Epidemiology, Population health and Infectious disease Control (EPIC):
  - *Simulate the spread of bovine tuberculosis (bTB) in Scotland;*
  - ***Data**: Cattle Tracing System (CTS) and VetNet data on bTB;*
  - ***Model**: SETI (Susceptible, Exposed, Test Sensitive and Infectious);*
  - *Match using Approximate Bayesian Computation (ABC) workflow;*
  - *EPIC-specific: varying disease dynamics, identifying "sentinels".*

EPIC – modelling diseases with the grid

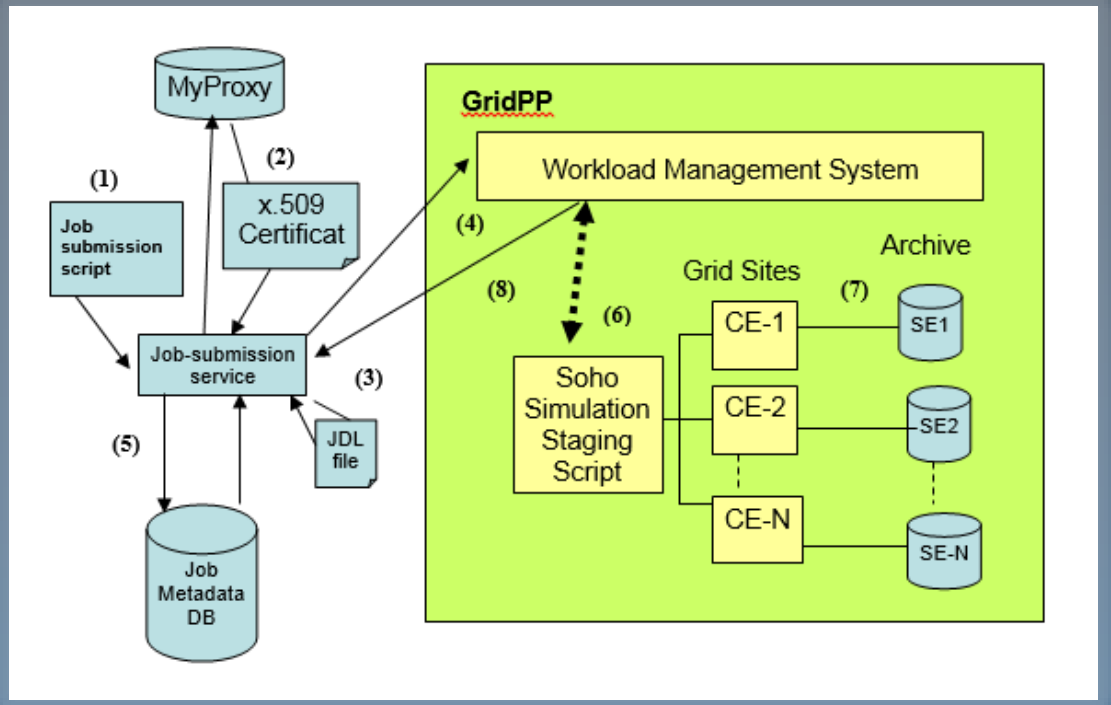
- For bTB, the model is SETI:
  - *Stochastic, individual (agent) based;*
  - *The transition between disease states follows compartmental models;*
  - *The parameters we are trying to fit are the transition rates between states;*
  - *Tau Leap algorithm used to take large (larger than one day) time steps.*
- Typical workflow:
  - *Initial conditions sampled from a set of priors for each parameter;*
  - *Parameter space explored – save conditions that pass sim./data statistics distance measure, values binned and plotted as a posterior distribution.*

EPIC – grid usage

- Resource usage:
  - *Must run model 1000's of times to get a meaningful posterior distribution;*
  - *Defra bTB work - optimised to take 4 minutes/job;*
  - *EPIC jobs take longer – 20-24 hours/job (100's -> 1000's farms).*
- EPIC enabled at 6 sites:
  - *Usage follows the fairshare policy system;*
  - *At one time: EDI (50), GLA (250), LAN (50), LIV (50), QML (75), RAL (250);*
  - *Varies between 2 and 10% total usage depending on other usage.*

EPIC – tools used

- gLite: WMS
- The jLite API:
  - *https://code.google.com/p/jlite/*
  - *Means to interact with the WMS.*
- Mainly custom frameworks/tools:
  - *Built with jLite, shell scripts, etc.*
  - *e.g. Soho for submission (right), job monitoring;*
  - *Custom, local DB for metadata.*



EPIC – issues, plans, feedback

- Issues:
  - *Custom tools - changes to/deprecations of EMI releases may break them;*
  - *Fairshare system - fair, much appreciated, but can still lead to delays…*
- Future plans:
  - *Moving to ARC-based CEs – will probably need to adapt custom tools.*
  - *Happy to act as a guinea pig for e.g. RAL.*
- General feedback:
  - *Fantastic resource, for free - many thanks!*
  - *Where problems encountered, help received from the local site admins; indebted to all of them for their great support and patience.*

Common themes

Tools used; recurring issues; general requests.

Common themes – tools used

- Combination of standard tools and custom frameworks being used.
- Ganga, DiRAC:
  - *Potential for more use - offers of support received.*
- instantUI, CVMFS:
  - *Already being used to make things easier for small VOs - many thanks!*
- Custom tools/frameworks:
  - *Easier to develop, tune to needs, run locally;*
  - *Lose benefits of pre-existing functionality;*
  - *Risk of breaking when dependent software/platform changes;*
  - *More or less effort to support?*

Common themes – issues, requests

- Fairshare - job prioritisation:
  - *Only an issue when VO activity scales up;*
  - *"Simply" make more sites available to VOs as they grow?*
  - *Testing - high priority for low intensity, quick turnaround jobs?*
- Lack of resources/mains d'œuvre:
  - *By definition, a common issue for small VOs;*
  - *Support for custom tools vs. documentation for "standard" tools (e.g. AMGA for metadata);*
  - *Who should be responsible for this?*

@GridPP @twhyntie

Thanks for listening!
Any questions?

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#GridPP32, Pitlochry, Scotland

Tuesday 25th March 2014

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Backup

Any extra material.

CERN@school – recent activity

- Timepix detector calibration:
  - *Energy measurements (Linear Transfer Energy, LTE) possible by calibrating the detectors with sources of known energy;*
  - *IEAP and SSTL collected calibration data – 241Am, 55Fe;*
  - *Langton students working on calibration data catalogue and analysis software;*
  - *Each of the 65,536 pixels per detector need four constants determined by curve (right).*