Fermilab | U.S. DEPARTMENT OF ENERGY | Office of Science

SBND (nee LAr1ND) FY16 and FY17 Computing Needs

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Scientific Computing Portfolio Management Team (SC-PMT) Review

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The SBND Collaboration

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- **University of Pennsylvania:** Nuno Barros, Shannon Glavin, Josh Klein (IB), David Rivera
- **University of Puerto Rico:** Kelwin Matias, Hector Mendez (IB), Samuel Santana
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- **Syracuse University:** Jessica Esquivel, Pip Hamilton, Greg Pulliam, Mitch Soderberg (IB)
- **University of Texas Arlington:** Jonathan Asaadi (IB)
- **University College London:** Michele Cascella, Anna Holin (IB), Ryan Nichol, David Waters
- **Virginia Tech:** Chun Min (Mindy) Jen, Camillo Mariani (IB)
- **Yale University:** Corey Adams, Bonnie Fleming (IB), Elena Gramellini, Ariana Hackenburg, Xiao Luo, Brooke Russell, Serhan Tufanli

Strong participation from non-US (UK, Swiss, Brazil, Puerto Rico) institutions: 13/28.

Scientific Goals

- SBND is the Neutrino Short Baseline Program Near Detector.
- It will be an 112 ton LArTPC located 110 m from the Booster Neutrino Beam Target.
- Commissioning/data taking should happen in 2018.
- Determine the oscillatory nature of the MiniBooNE excess once observed by MicroBooNE.
- SBND will observe ~O(1M) events/year – exciting cross-section measurement opportunities.
- R&D for future LAr detectors (DUNE).

Computing Strategy/Status

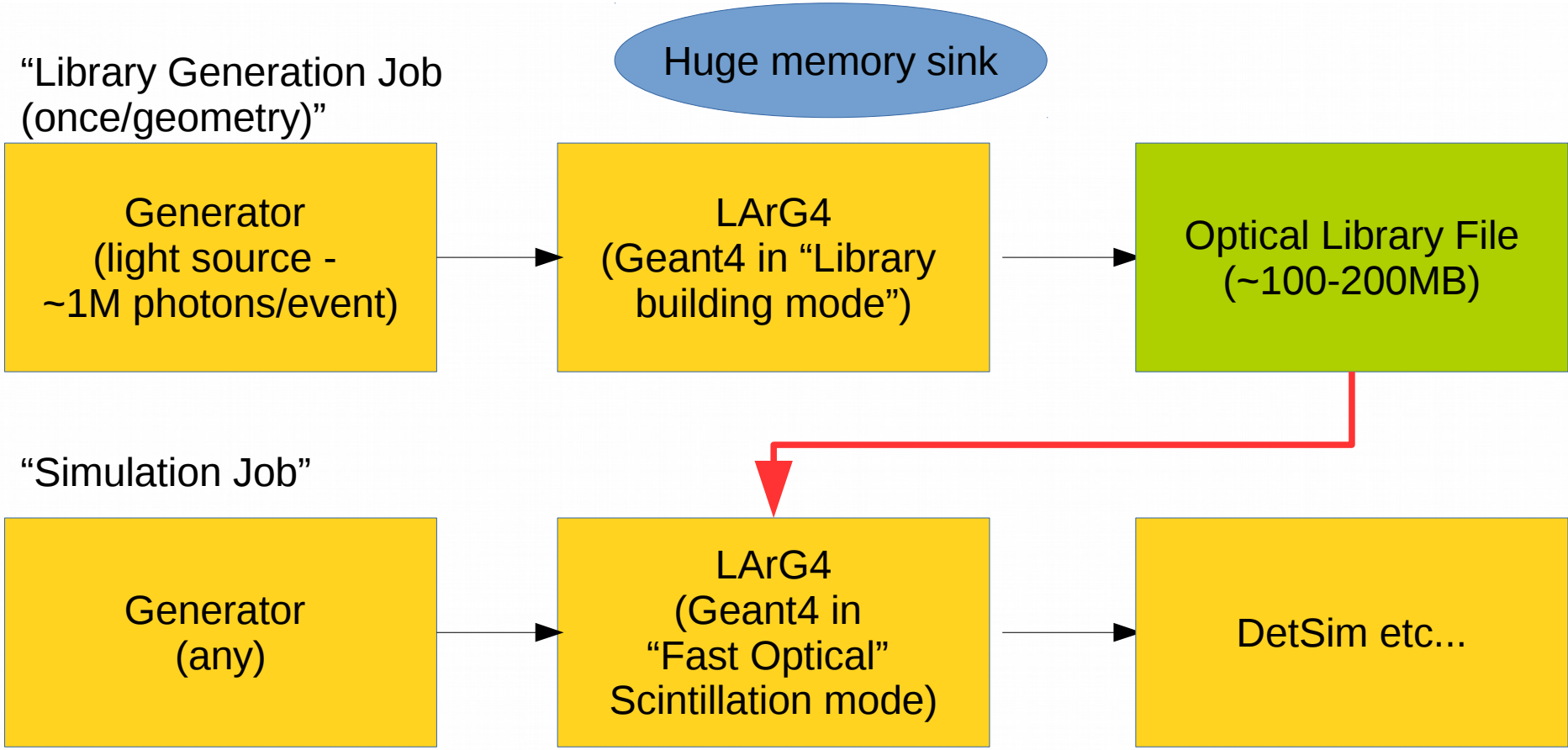
- In terms of computing we are following in MicroBooNE's footsteps.
- Use LArSOFT for simulation and reconstruction.
- Activity has been somewhat limited to Light Simulation due to hardware design preparation. It is now ramping up again with need for reconstruction (last parallel sim/reco session at collaboration meeting had a majority of speakers from non-US institutions!)
- Accessing resources from off-site often comes up.

Goals for FY 16

- Computing:
  - Change name of resources (LAr1ND-> SBND)
  - Finalize detector design (need e.g. light simulations)
  - Get Full reconstruction chain working
  - Launch 1-2 Monte Carlo Challenges (MCC)
- Experiment:
  - Start building construction
  - Start APA (wire planes) construction

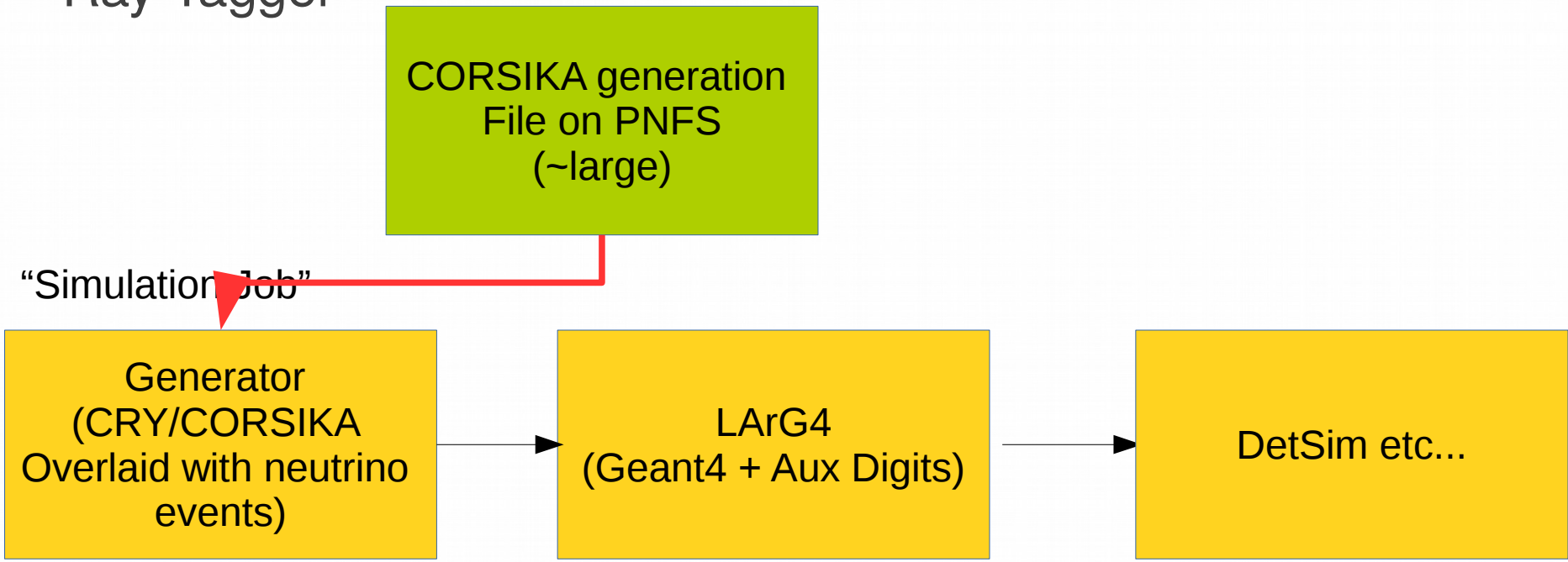
Main Types of computing Jobs

- Scintillation Light Simulation (LarSoft, D. Garcia-Gamez)



Main Types of computing Jobs

- Cosmic Ray Simulation (LarSoft)/part of the SBN cosmic task force (R. Guenette + M. Bass)
- Determine the need for Overburden + efficiencies of Cosmic Ray Tagger



Overview of SBND (nee LAr1-ND) computing needs

- Changing name
- Disk Space/Spaces
- Batch Computing
- Other Services
- LArSOFT

Changing Name

- Most of our resources still refer to LAr1ND – we would like to change all that is reasonably possible to SBND related names to avoid confusion.
- We think we know what this entails (thanks Mike Diesburg) and are talking to the DUNE folks about their experiences.

Disk Space/Interactive Computing

- Have two gpvms (lar1ndgpvm01 & 02)
- Bluearc: 10TB of data (47% used) + 1TB of app (81% used)
- Have shared, volatile pnfs/dCache space.
- As the activity will be increasing soon, we would like to request:
  - 2 more interactive nodes (1st near future, 2nd closer to summer/fall)
  - +8TB of Bluearc /data +1TB of /app
  - Persistent dCache space 15TB
  - We would like to set up the write to tape capability by the end of FY16/early FY17.
  - We are watchine the DUNE experience with a build-only machine – if this works well, we would be interested in replicating that.

Batch Computing

- SBND uses jobsub (via larbatch) to launch grid jobs mainly on FermiCloud. Have tried, and had small success with other tools off-site (ganga).
- Need to copy the data flux-file copying solution from MicroBooNE for library generation and cosmic jobs.
- Due to the nature of our jobs (optical library generation), we constanly run into memory problems even >6GB. We would like to expand to OSG, but this might be a limiting factor (code restructuring might help, lacking manpower). Cutting down generation to v. small event sizes helps, but becomes difficult to manage and glue together.
- While finalizing Optical System design, expect: 1.5M cpu-hours > 4GB jobs through end of FY16 at Least.
- Proposed MCCs should have a smaller memory and time footprint, expect <1M cpu-hours <4GB jobs in FY16.

Software Framework/LArSoft

- We use LArSoft/ART. We have a fairly large number of users who are new to the LAr@Fermilab world. Previous tutorials about ART and LarSoft were really helpful and more would be great.
- Generators: We use GENIE, CRY, CORSIKA
  - Build on MicroBooNE experience.
- Geant4 for detector simulation.
  - Help with physics lists would be appreciated.
  - Insight on speed/memory issues would also be helpful.

Other Services

- Would like to request CVMFS space for SBND.
  - Very helpful for users outside of Fermilab.
- We have Jenkins build space – have not really exercised it.
- A couple of requests for Databases will be coming in the next months. Possibly a'la MicroBooNE design.
- We are starting to look into a job manager, a'la PUBS from MicroBooNE.

Collaboration Tools

- Docdb: http://sbn-docdb.fnal.gov
- Redmine: https://cdcvs.fnal.gov/redmine/projects/sbnd
  https://cdcvs.fnal.gov/redmine/projects/lar1ndcode/wiki
  - Source code repositories
  - Wiki's
  - A couple of separate projects
- WWW server: http://sbn-nd.fnal.gov
- Readytalk.
- Electronic Log Book (not yet used, will request soon)

Other/Future

- We don't expect big conference deadlines in FY16, we want to get an MCC production run before the summer to have events for students.
- KCA certificates – in talks with K. Herner, do not expect this to be a significant problem.
- AFS change – need to investigate.
- TSW – does not exist?
- In the next two years we will be reasonably quickly ramping up to near MicroBooNE activity levels.

Summary

- SBND will ramp up with reconstruction and computing in the next months.
- Have some resources, we will start using them even harder in the near future.
- A large fraction of active users are off-site (and non-US institutions).
- Expect a rise in use to current MicroBooNE levels by 2018.