NNN15 Water Detector Satellite Meeting

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Meeting Goals

- It would be useful to enhance both collaboration and global planning efforts among people interested in current and future water detector experiments

  - Several groups worldwide are working somewhat independently on many issues facing current and future water detectors (e.g. simulation & reconstruction tools and detector technology R&D)

- The LAr community has made an effort to share tools (e.g. LArSoft) and to engage in a world-wide planning effort (Fermilab SBN, WA105, protoDUNE, leading to DUNE)

  - A similar exercise could be useful in the water detector community

    - This has already begun among the UHE neutrino experiments

      - http://www.globalneutrinonetwork.org/

    - It may be useful to extend this concept to lower-energy projects, particularly as the neutrino telescopes push to lower energies

- Finally, this workshop allows for more detailed discussion on some topics in the the NNN program (software issues, inter-experimental collaboration and manpower needs), as well as discussion of topics that could not be fit into the main workshop program (e.g. T2K2, additional PMT tests, TRIUMF test facility, etc.)

Example Synergies

- Gd doping (ANNIE, WATCHMAN, NuPRISM?, IsoDAR, Super-K, Hyper-K, Daeδalus, ...)

  - Purpose of ANNIE is to understand proton decay backgrounds

  - NuPRISM can calibrate the neutron production as a function of neutrino energy and lepton kinematics

- WbLS (THEIA, NuPRISM?, Hyper-K?, ...)

  - THEIA plans to use WbLS, and some interest exists within Hyper-K as well (motivation to calibrate the response using NuPRISM)

    - More discussion today on whether these projects,

- Photodetector R&D (All)

  - PMTs: HQE, box and line, HPD, additional light collection, etc.

  - LAPPDs: great for most applications if timescale is fast enough

  - multi-PMTs: planned for KM3NeT and PINGU; significant interest for Hyper-K

    - Already significant collaboration between KM3NeT and Hyper-K (more today)

  - e.g. NuPRISM hopes to incorporate many of these technologies for R&D

  - Which technologies are important for future experiments, and how can these R&D efforts support one another?

Intermediate Program

- The US (and, to a lesser extent, Europe) is currently in a LAr-centric funding paradigm

  - Long-term focus is currently DUNE

- However, intermediate program likely has room for other neutrino detectors

  - e.g. ANNIE, WATCHMAN, PINGU, extended T2K run, NuPRISM, ...

- In order to build future large water detector(s), effort will be needed to keep detector components, software tools, analysis techniques, etc. up-to-date

  - Need to maintain critical mass

    - What is required to achieve this? More concentrated effort / collaboration needed?
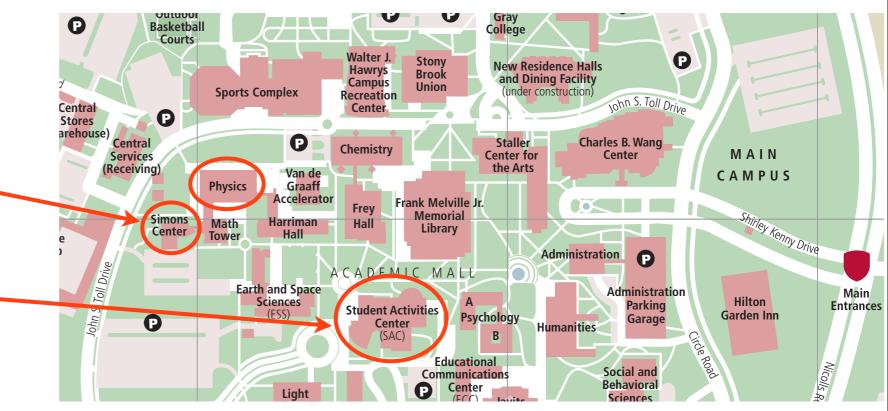
Possible Workshop Outcomes

- Proposals for MOUs to share some software among experiments

  - WCSim is already open source, but some other commonly used packages are not

  - Gauge interest in a global WCSoft group (similar to LArSoft)

- Increased collaboration among experiments

  - Either formally (joining experiments) or informally (software, complementary photosensor testing, WbLS R&D, etc.)

  - Certainly Japanese experiments are looking for more US and European participation (NuPRISM & HK; SKGd also a possibility)

    - ANNIE is in a similar situation

Meeting Format

- Talks are meant to be brief (no need to fill entire allocated time)

    - This will allow more time for discussion

- Focus of this meeting is less on physics capabilities or results, and more on software tools used, manpower needs, detector R&D intended or needed, etc.

- Discussion Sessions

    - Detector R&D

        - Which technologies are important? On what timescales? Complementary R&D efforts?

        - Is any additional collaboration needed among the Gd applications? For WbLS, a global R&D effort may be needed for putting in / taking out / keeping pure WbLS (a la Gd / EGADs effort). On what timescale is this achievable?

    - Software / Experimental

        - Which software packages can serve multiple experiments? Which are the most promising for the future? Can they all be maintained? Should they all be maintained? Feasibility for global access and development of software packages

        - Sufficient manpower for each project (and possible solutions)? How would various photosensor technologies enhance capabilities? Importance of Gd or WbLS to physics goals? Would information sharing be beneficial (e.g. Hyper-K and KM3NeT)?

    - Clearly, participation encouraged (including remote attendees)

- Some people will be touring the BNL WbLS facilities this week; contact Minfang Yeh if interested

Local Logistics

- Morning and afternoon coffee breaks take place in D-122 (this room)

- On campus lunch options:

  - Simons Center

  - Student Activity Center (SAC)

- Dinner

  - On your own, or at the Port Jefferson Lobster House

  - If you wish to come to the Port Jefferson Lobster House, please sign up using the following link (prior to lunch, if possible):

    - http://doodle.com/poll/isfky79zfvq7zpb5