CalVision Introduction

Physicists in the US (Argonne, Caltech, FNAL, Maryland, Michigan, MIT, Oak Ridge, Princeton, Purdue, Texas Tech, Virginia) received in 2022 funding for an initial 3-year program in dual-readout calorimetry. Our goals are:

- Advanced simulations of crystal-based measurements with maximum flexibility of materials etc. Support for Simulation like Geant4 is especially critical and requires support further development of models and continuous physics validation. There is also the need to identify small experiments that can help to further constrain and tune current model and the parameters thereof.
- Understanding how to make maximal use of possible measurements for improvement of calorimeter performance (e.g. see arXiv:2107.10207), including early and/or late timing, light polarization, light angle
- Further development of novel particle flow algorithms for this type of calorimetry, including interplay with other detector elements
- Verify the Cherenkov/scintillation yields and separation from https://arxiv.org/abs/2008.00338 on bench and via test beams
- Measure z coordinate of energy deposit in fiber via precision timing
- Find new materials with lower cost (current emphasis is glasses) (see next talk in this session)
- Follow new photodetector developments that allow further improvements (SPADs, dSiPMs)
- Design new electronics to allow on-detector measurements via new generations SoC ASICs and FPAAs with data processing (analog or digital) in the front end of timing, time over threshold, C/S ratios with 2-layer NNs (with CAEN and NALU)
- Low-mass mechanic support for the precision EM calorimeter

We are also interested in developing a more extensive set of physics benchmark processes to be sure that we design the future detectors we need to do the full physics programs of future machines.

Our web site and indigo are https://detectors.fnal.gov/projects/calvision/ and https://indico.fnal.gov/category/1426/ We have monthly meetings. We also have a mattermost channel.
New collaborators are welcome to join! (e.g. many opportunities for short-term student simulation work)