Simulation

Sarah and I partitioned some of single xtal simulation projects to move towards our common tools for bench and test beam studies. Lines of inquiry:

- **Homebrew code using standard GEANT4 APIs (at least two versions in hand)**
  - 'easier' start up, but can be awkward to make changes
  - User coded geometry in C++ is tedious and error prone

- **DD4HEP (Sarah's slide)**
  - Not so easy to learn
  - Future advantages for large scale simulation, especially if detector elements (eg trackers) can be dropped in

- **CATS**
  - Sarah started looking at this package w/ help from Hans. Built a working example based on cvmfs
  - geometry/materials description in gdml   (similarities to DD4HEP here)
  - "auto" histogramming based on sensitive detector elements
  - Integration w/ GPU acceleration
  - I recently built a version based on a conda environment on the UVa HPC/GPU cluster
    - So far just using CPU, learning about gdml
    - GPU builds tests next

Our plan over the fall is to compare results from different approaches to see and hopefully understand better the variation in the optical simulation results.

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