

Prospects and Plan of software

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1. Summary of current status and problems

- WCsim
 - Agree with skdetsim even in low energy.
 - Hyper-K cross section is implemented. Validation work is underway.
 - Dark hit simulation is added.
 - Start to study of effects of detector length with simple way. Need to check with reconstruction tool.

To do list for WCsim study

1. Need validation for WCsim with real Hyper-K cross section.
2. Need to understand why momentum resolution doesn't depend on the detector length.
 - Due to include scattered and reflected light ? Apply time and space cuts.
 - Turn on dark noise.
 - Apply fitQun .
 - Use Hyper-K cross section.

Current status of fiTQun

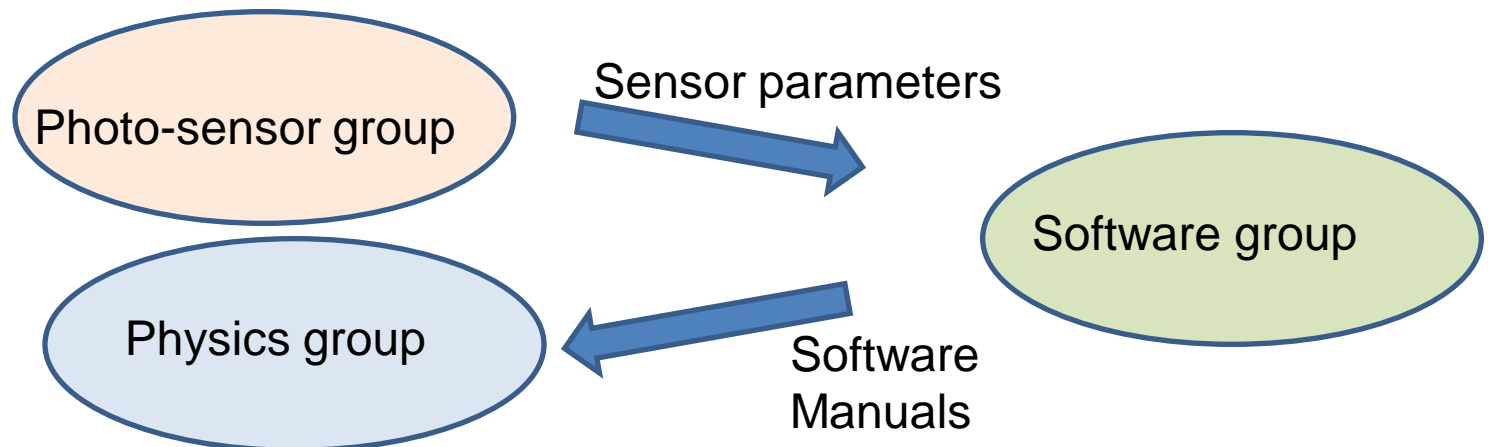
- Interface between WCsim is made and succeed to apply fiTQun with SK geometry mode.
- Find many sub-events even in single particle gun. Sub-event builder may have problem.
- Momentum is reconstructed lower than true value.
- Vertex and momentum resolution is not so bad comparing to skdetsim.

To do list for fiTQun

1. Investigate why sub-event builder pick up so many sub-events.
2. Need to tune fiTQun for WCsim.
3. Check reconstruction variables (vertex, direction, momentum, PID, ring counting) and compare with Skdetsim (find more problems?)
4. Apply fiTQun to real Hyper-K geometry

2. Some thought about detector optimization

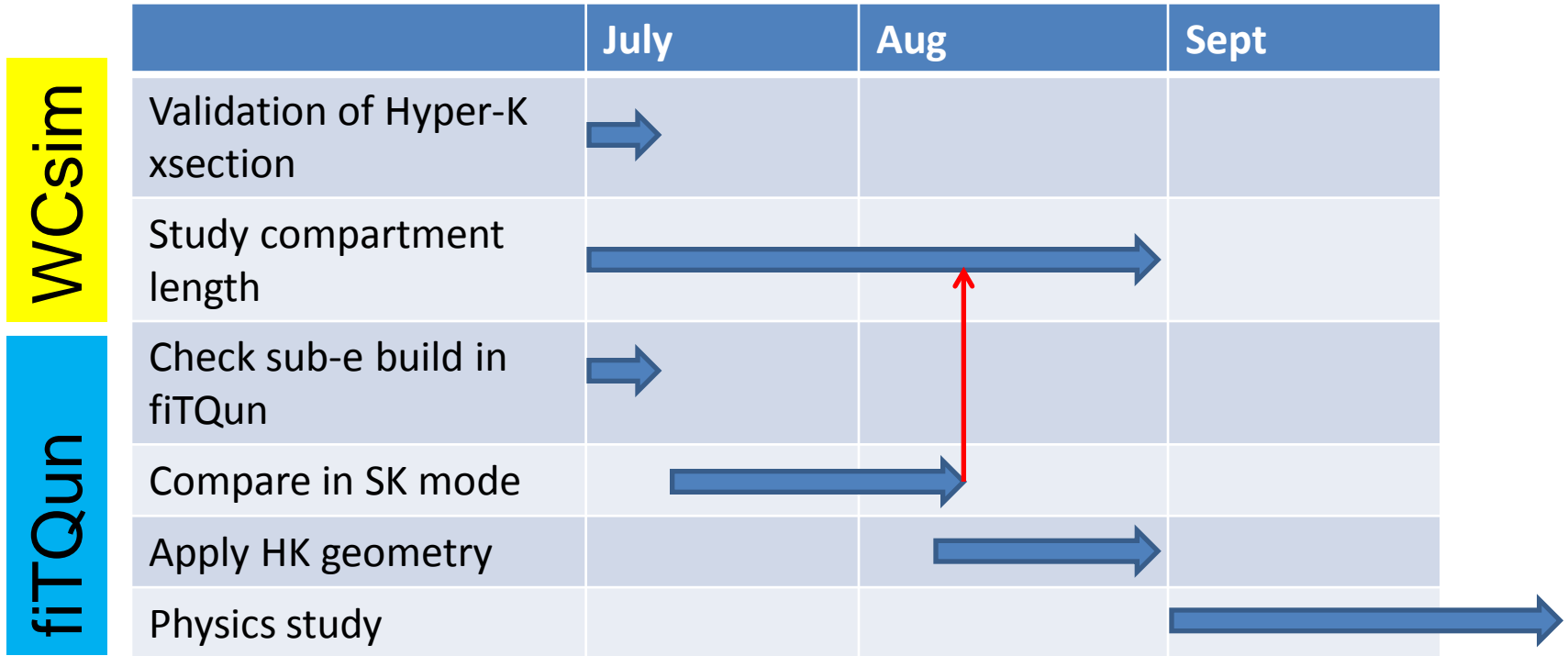
- Cannot be done only by software group. **Need to collaborate with other groups.**
 - Need sensor parameters from photo-sensor group.
 - Physics sensitivity should be studied by physics groups.
- **Software group aims to provide simulation and analysis tool, and prepare document how to use them.**



What parameters should be optimize?

- For cost estimation, important parameters are;
 - **Compartment length**: how impact on each physics ?
 - **QE**: can we reduce number of sensors if QE is high ?
- So we need;
 1. 20 % coverage with 5 compartment, 22 % QE (20inch PMT)
 2. 20 % coverage with 3 compartment, 22 % QE
 3. 13 % coverage with 3 compartment, 30 % QE

3. Plan



Provide software and document to physics group before September.