

# Questions around ...

**Shan Huang (shan.huang@desy.de)**  
**Tel Aviv University**

3 December 2020

# What I did ...

(before two weeks ago)

- Theoretical calculation and simulation
- Focused in the laser part
  - QED vacuum photon scattering
  - QED vacuum birefringence
  - Axion production with laser

# What I'm doing

- Very very **green** in experimental particle physics
- Went through the layout and tools with helps from Halina, Yan, Louis, Ranjit, ... (Many thanks!)
- Writing a python code to cross-check the counting results

# Questions around ROOT files

We might need a wiki on simulation results?

“Tracks”	eventid	trackid	detid	pdg	phys- proc	E/px/py/ pz	t/x/y/z	vtxx/y/z	theta/ phi	x/y/ zlocal	p- trackid	nsec- ondary	<b><i>weight</i></b>
Data type	integer	<i>vector</i>	<i>vector</i>	<i>vector</i>	<i>vector</i>	<i>vector</i>	<i>vector</i>	<i>vector</i>	<i>vector</i>	<i>vector</i>	<i>vector</i>	<i>vector</i>	<b><i>double</i></b>
“Hits”	eventid	<b>track_ list</b>	detid	<b>hitid</b>		<b>edep</b>	layerid	cellx/y	trackx/ y/z				<b><i>weight</i></b>
Data type	integer	<b><i>vector</i></b>	<i>vector</i>	<b>integer</b>		<b>double</b>	integer	integer	<i>vector</i>				<b><i>double</i></b>
“HitTracks”	eventid	trackid		pdg	pproc	E/px/py/ pz		vtxx/y/z			ptid		<b><i>weight</i></b>
Data type	integer	<i>vector</i>		<i>vector</i>	<i>vector</i>	<i>vector</i>		<i>vector</i>			<i>vector</i>		<b><i>double</i></b>

# Questions around ROOT files

- One file = 1 BX?
  - Yes
- Are “eventid”s linked?
  - Yes
- Are “weight”s linked?
  - Weight in track: particle number
  - Weight in hit: energy multiplier
- How to calculate deposit energy?
  - $E = \text{edep} * \text{len}(\text{track\_list})$
- Results vary a lot (!) between BXs.  
Is it normal?
- What does “hitid” mean?
- Some trackid missing in “Tracks” tree...

# Questions around processing

- How to identify TS/SS from BB
  - “proc” parameter (limited for hitting through particles from tracker/secondary signal)
  - Identify backscattering from “vertex” parameters
  - Block low-energy particles (omit the first and last layers)
  - Energy spectrum
- How to sum the energy deposits from a “shower” up to its “root” particle (“reconstruction”)
  - Assume every particles enter calorimeter “die” there and just sum up their initial energy
  - “vertex” parameters
  - Tracking algorithm (?)
  - Reconstruction algorithm