



LUXE

weekly meeting



Beate Heinemann (DESY and University of Freiburg)

December 16th 2020



CDR CURRENT SITUATION

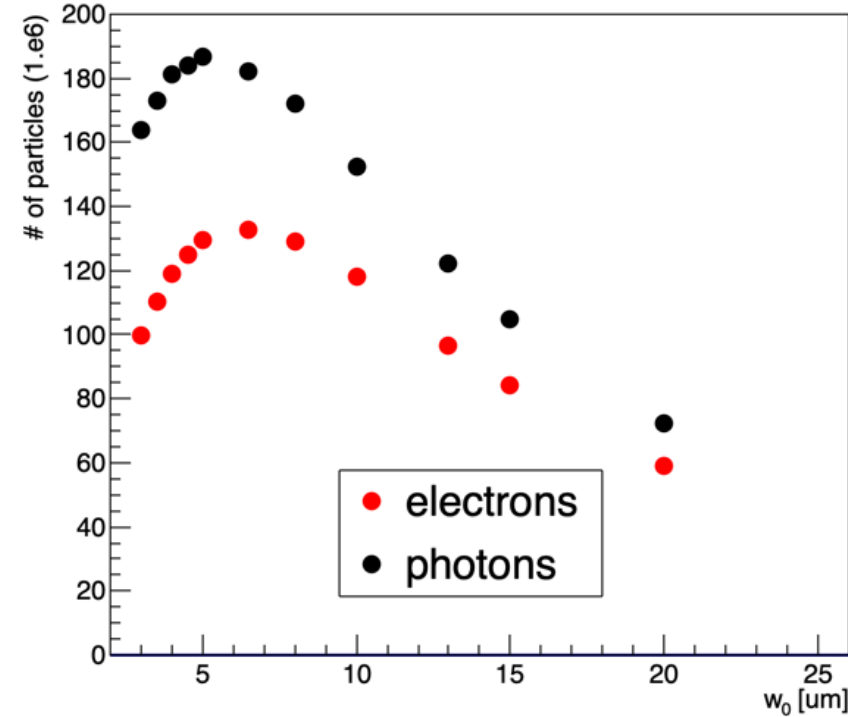
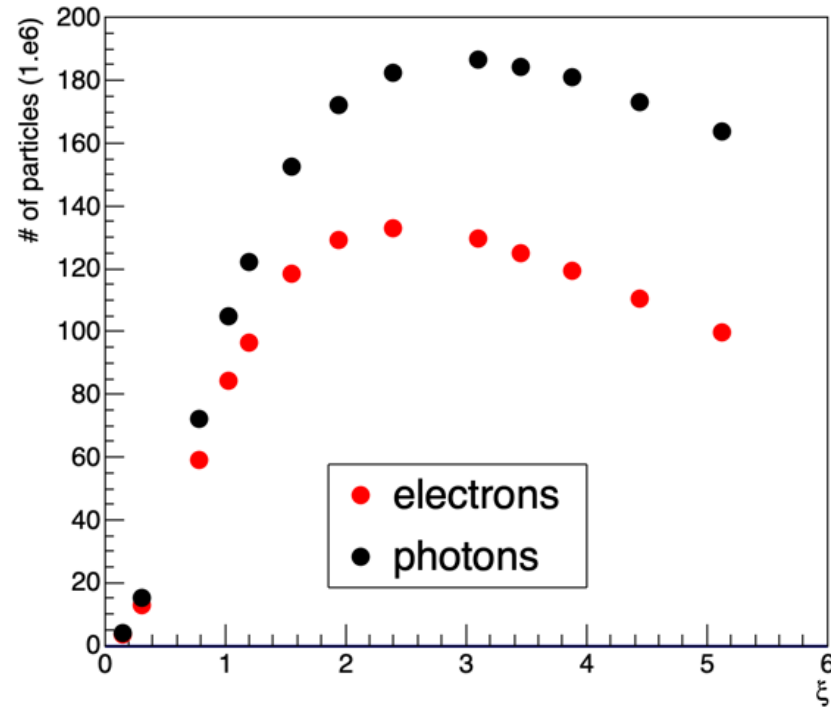
Physics simulation has again changed a bit more

- Many cross checks of theorists!! => **Thanks a lot!**
- Another problem found in normalization (factor 4)
- Production still ongoing but first files available
- Results need to be updated to account for new simulation but simulation still ongoing
- Results chapter will not be ready before the holiday period

Review of all other chapters progressed in parallel

- Will circulate those by Wednesday (Dec. 23) at the latest

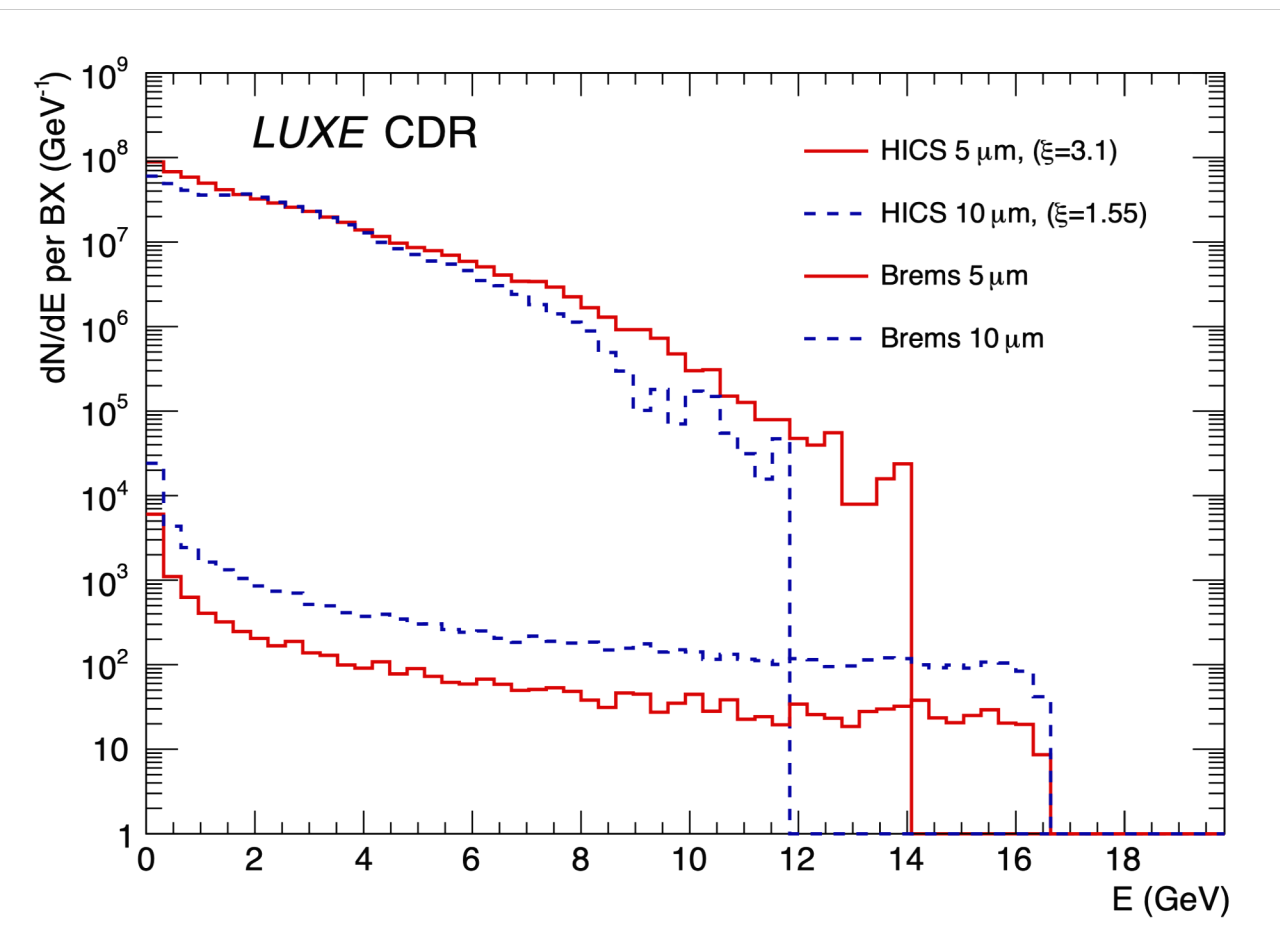
MONTE CARLO: COMPTON PROCESS



New files
(from Dec. 14/15)

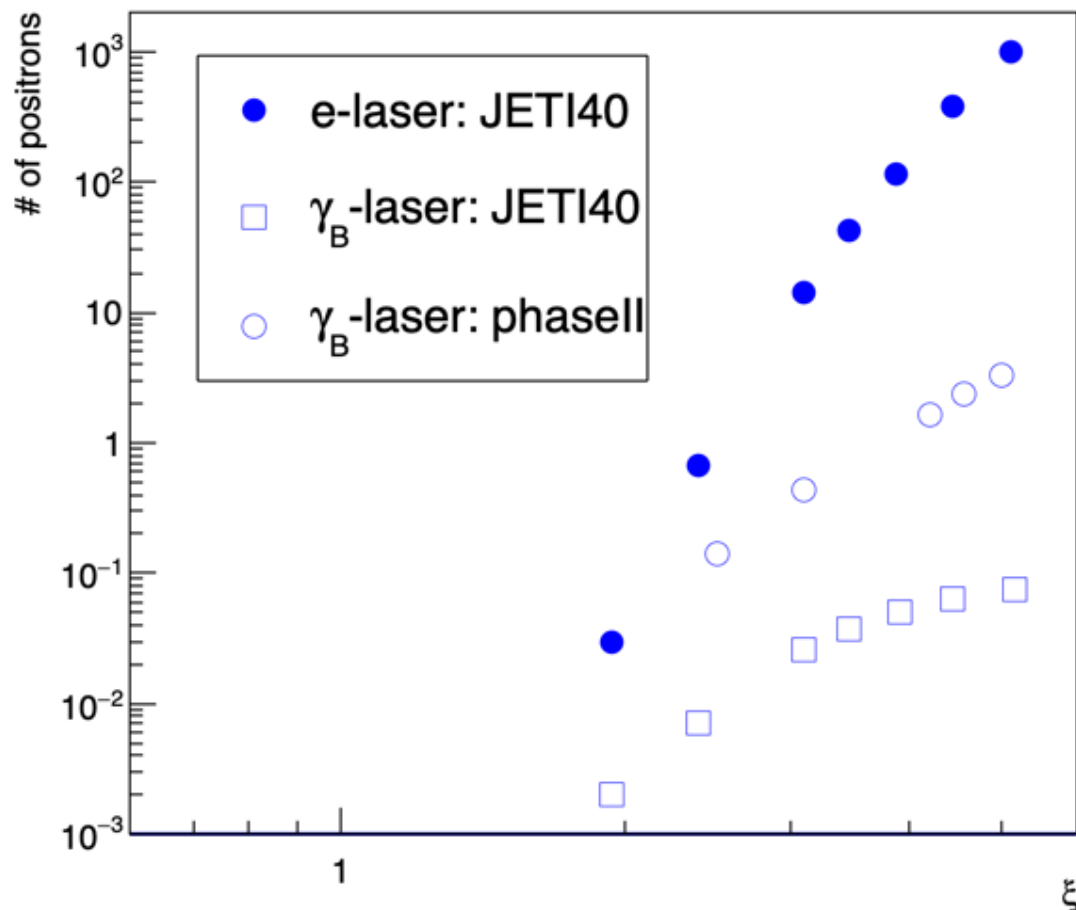
- Presumably decrease at high ξ (low w_0) is due to reduced fluence (laser spot size < e beam size)
 - Electron beam size: 5 μm
- Particle rates: $\sim 1\text{-}200 \times 10^6$

MONTE CARLO: PHOTONS



- Photon energy spectrum harder for Brem process but significantly lower flux
 - Only about 10^{-4} of the photons produced arrive in laser spot at IP
- ICS photons have much higher flux
 - Thus also provide larger flux of e^+e^- pairs

MONTE CARLO: POSITRON PRODUCTION



Rates of positrons higher for e-laser process

- Positron production rate < 0.1 /laser shot for gamma-laser JETI40

Strategy:

- e-laser as primary/initial process
- Photon-laser as “very important addition” as it provides more direct access to understanding pair production
- Only consider it in phase II and not for JETI40 running?

UPDATED CDR TIMELINE

- **Timeline:**

- November 30th:

- Finish the results based on simulation and document them in CDR as draft

- Dec 1-7:

- Update all chapters individually

- Dec. 8-14:

- Circulation for everyone read through and make further comment

- Dec. 15-23:

- Beate to do full pass through and recirculate once more until Jan. 6th
- Will continue to work on results chapter in parallel and send that asap
- **Important: I will reduce edit-access** as I am trying to produce a final version! So, please, make any changes ideally by the end of today (also detector chapter to be moved into main stream tomorrow morning) [Afterwards changes only by lead editors possible]

- By Jan 15:

- Address comments and submit draft to PRC [and arXiv]



EUROPEAN XFEL: SCHEDULE

EU.XFEL shutdown schedule for first half of 2024 => can make real schedule!

- Confirmed by Council

New tentative time scale for discussion

	2022	2023	2024	2025	2026	2027	2028
Phase	Design, Install & Commission			Phase I		install	Phase II
Accel.	Prepare& design	install		operation			
Laser 30 TW							
Laser 300 TW							
Civil Con.							
Detectors							
Simulation							



COMMENTS ON PROPOSED SCHEDULE FOR LUXE

- **Phase I: omit the gamma-laser running from default plan**
 - This means also we can start phase II earlier
 - Phase I becomes more of a “pilot run” (1.5 years, could even reduce to 1y?)
- **Phase II: start again with e-laser running but emphasize importance of gamma-laser running for full exploration of physics**
 - Gamma-laser has some unique advantages even though the rate is lower.

Advantages

- Gives us more time to work out the concurrent running of e-laser and gamma-laser (which I think is critical in fact); we don't need it for phase-1 but only for phase-II
- CDR would discuss the gamma-laser running but not need to provide as much technical information
- Saves financial (~320K for detectors and 100K for beam dump) and manpower resources during initial phase of project
- Simplifies initial construction when anyway a lot of complicated construction is ongoing
 - Will need more construction later but seems reasonably to assume that this can be done in 6-week winter shutdown

COSTING

Massimo et al. have done a lot of work on the costing

- Will discuss in more detail in later meeting

Current indications for the capital cost at present are

- Laser: 4.6-5.1M (includes 3M for phase-2 laser)
- Detector: 1.1M (phase1+2)
- Infrastructure: 1.8M
- Machine 2.7M

Total cost: phase 1+2: 10.2-10.7M

- Phase 1 only: 6.8-7.3M

FURTHER NEWS

A lot of progress on simulation

- Have no time to do it justice today
- Will have meeting on Jan. 6th and can devote that to “simulation” and “results”

DESY management

- Current DESY director for particle physics, Joachim Mnich, leaves DESY at the end of this year (to go to CERN) and is replaced by Ties Behnke as “interim director” while an international search for replacement is ongoing



THANKS TONY!!

Tony is leaving to start a new job

I want to deeply thank him for his tremendous work during the past two years!!!





HAPPY HOLIDAYS



In wish everyone a relaxing holiday period, and those who don't have holidays a calm working time!