

Theory and simulation milestones

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Updates after LUXE analysis and simulation meeting, 16/Feb/2021

Theory plan

- T0) NLC in a CP laser pulse in simulation and theory-benchmarked [10/20]
 - T1) NBW in a CP laser pulse in simulation and theory-benchmarked [05/21]
 - T2) Approximate Trident in CP laser pulse (with no photon polarisation), benchmarked with theory [07/21]
 - T3) Photon-polarised NBW in a CP laser pulse in simulation and theory-benchmarked [12/21]
 - T4) Photon-polarised NLC in a CP laser pulse in simulation and theory-benchmarked [12/21]
 - T5) Trident in in a CP laser pulse in simulation and theory-benchmarked [06/22]
 - T6) Repeat CP->LP laser background [12/22]?
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- Inverse Compton scattering process ?

Simulation plan

- S1) GEANT and reconstruction code in (GIT) repository [05/21]
- S2) Have frozen GEANT simulation: what should be included — priority list. [06/21]
- S3) NBW sample simulated in experiment using GEANT [07/21]
- S4) Trident sample simulated in experiment using GEANT [09/21]
- S5) Event data model decided before generation of large samples [10/21]
- S6) Reconstruction software ready, background samples generated [10/21]
- S7) Photon-polarised NBW and NLC samples simulated in experiment using GEANT [12/21]
- S8) Large samples of all processes **including all backgrounds** simulated in experiment using GEANT [12/21]
- S9) Trident sample simulated in experiment using GEANT [08/22]
- S10) Large samples of all processes simulated in experiment using GEANT [12/22]
 - Have frozen GEANT simulation: what should be included — priority list.
- S11) Digitisation of detectors (after beam tests) [03/23]

Dependencies:

- S3 follows T1
- S4 follows T2
- S7 and S8 follow T3 and T4
- S9 follows T5
- S10 follows T6

Theory contingency

- T0) NLC in a CP laser pulse in simulation and theory-benchmarked [10/20]
- T1) NBW in a CP laser pulse in simulation and theory-benchmarked [12/21]
- T2) Approximate Trident in CP laser pulse (with no photon polarisation), benchmarked with theory [12/21]
- T3) Photon-polarised NBW in a CP laser pulse in simulation and theory-benchmarked [06/22]
- T4) Photon-polarised NLC in a CP laser pulse in simulation and theory-benchmarked [06/22]
- T5) Trident in in a CP laser pulse in simulation and theory-benchmarked [09/22]
- T6) Repeat CP->LP laser background [06/23]?

Simulation contingency

- S1) NBW sample simulated in experiment using GEANT [12/21]
- S2) Trident sample simulated in experiment using GEANT [12/21]
- S3) Photon-polarised NBW and NLC samples simulated in experiment using GEANT [12/21]
- S4) Large samples of all processes simulated in experiment using GEANT [08/22]
- S5) Trident sample simulated in experiment using GEANT [11/22]
- S6) Large samples of all processes simulated in experiment using GEANT [06/23]

Summary/discussion

- Have a plan for theory and simulation leading to milestones.
- Started from milestones for theory and physics simulations which led to milestones for GEANT simulations.
- Taken into account having a TDR at the end of 2021.
- Have some contingency.
- Define what we want to have in each GEANT simulation ?
- Are there other simulation milestones ?
- Are there other plans that affect the milestones proposed ?