Signal simulation status

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LUXE Simulation and Analysis Task Force

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Pair creation in PTARMIGAN

Theory and simulation milestones

1	Signal prod.		4/6 completed
3	✓	Date	Task
4	☑		~~electron-positron pair creation (nonlinear Breit-Wheeler)~~
5	☐		photon polarization dependence in Compton and Breit-Wheeler rates (needed for improved trident predictions)
6	☑		~~accept photon distribution input (bremsstrahlung/ICS)~~
7	☑		~~inconsistency with Tony's MC (overall factor of sqrt2 and angular structure)~~
8	☑		~~change output format (binary + metadata)~~
9	☐		extension of pair creation to allow for user-defined charge and mass
10	☐		
11	☐		

Theory/sim milestone
Sept 2022

Estimates computed, but not currently on roadmap

We should agree on a nominal set of parameters for TDR signal simulation runs

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Theory and simulation milestones

- Theory and simulation milestones:
  - NBW in a CP laser pulse in simulation and theory-benchmarked [May 2021]
  - Approximate Trident in CP laser pulse (no photon polarisation) [July 2021]
- Implement LMA and LCFA pair creation rates, as well as "perturbative (leading order) LMA" 
- Benchmark simulation against theory for pulsed plane waves 
- Simulate gamma-laser collisions with approximate photon spectrum, phase 0 and 1 
- Simulate electron-laser collisions, phase 0 and 1 
- Simulate ICS gamma-laser collisions, phase 1 – HDF5 formatted data already provided (thanks Daniel!) 

Data available at `/nfs/dust/luxe/group/MCProduction/Signal/ptarmigan-v0.7-preview`