LLP Searches at the FCC-ee - Snowmass LOI

https://www.snowmass21.org/docs/files/summaries/EF/SNOWMASS21-EF8_EF9-RF6_RF0_Rebeca_Gonzalez_Suarez-147.pdf

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- First (short) meeting with the interested parties
- Goal: figure out the specific interestes of the people that have signed up

FCC-ee Discovery machine and more

- **EXPLORE** the 10-100 TeV energy scale region with precision measurements of the properties of the Z,W,Higss and top particles
  - 20-50fold improved precision on EWK observables
  - 10 fold more precise and model-independent Higgs coupling measurements
- **DISCOVER** that the Standard Model does not fit
  - Existence of extra-weakly-coupled and Higgs-coupled particles
  - Understanding of the underlying physics structure
- **DISCOVER** a violation of flavour conservation/universality
- **DISCOVER** very weakly coupled particles in the 5-100 GeV mass range
  - Such as right handed neutrinos, dark photons,ALPS …
- **DISCOVER** dark matter as invisible decays of the Z or Higgs

Long Lived Particle: how to organize?

- Interest from many sides: theorists (model builders), phenomenologists, experimentalist from colliders and not (PBC)
- To guide the discussion we outline three possible lines of work:

1) considering new models with new long-lived or unusual signatures and explore the sensitivity of the FCC with generator level studies, or FastSimulation studies
    - some development in Delphes are needed
    - *Mostly theorist work?*

2) choosing a few benchmarks models with specific and different signatures to extract information about detector requirements.
    - some can be done with FastSimulation
    - some FullSimulation will be also needed at some point
    - *Collaboration of pheno+exp ?*

3) for selected signatures explore specific detector technologies and characteristics, simulation and reconstruction algo developments
    - *experimental+software interest ?*

From all this we could(should?) also come up with new proposal for a detector concept optimized for this type of searches.