

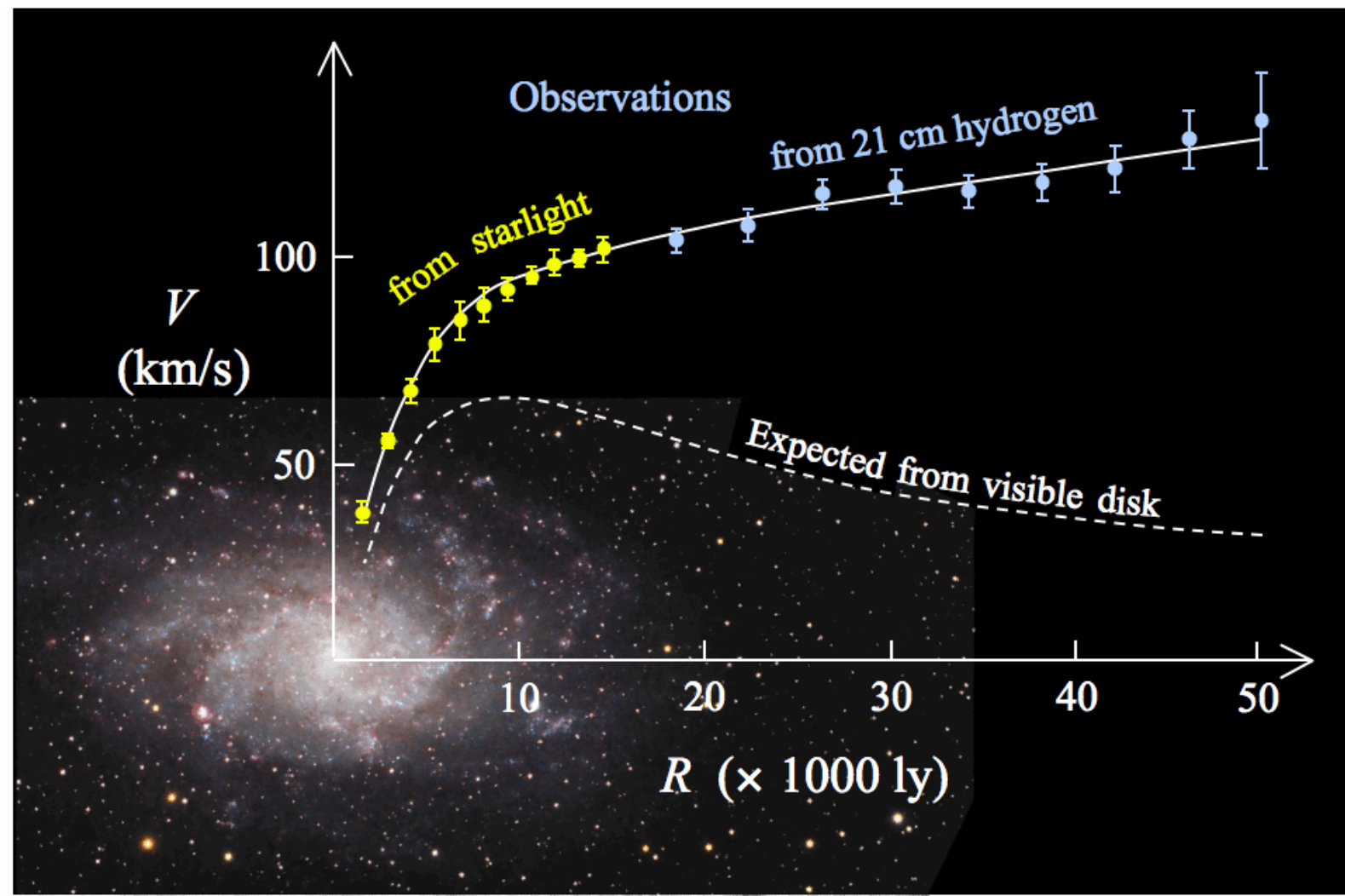
The Light Dark Matter eXperiment and Its Backgrounds

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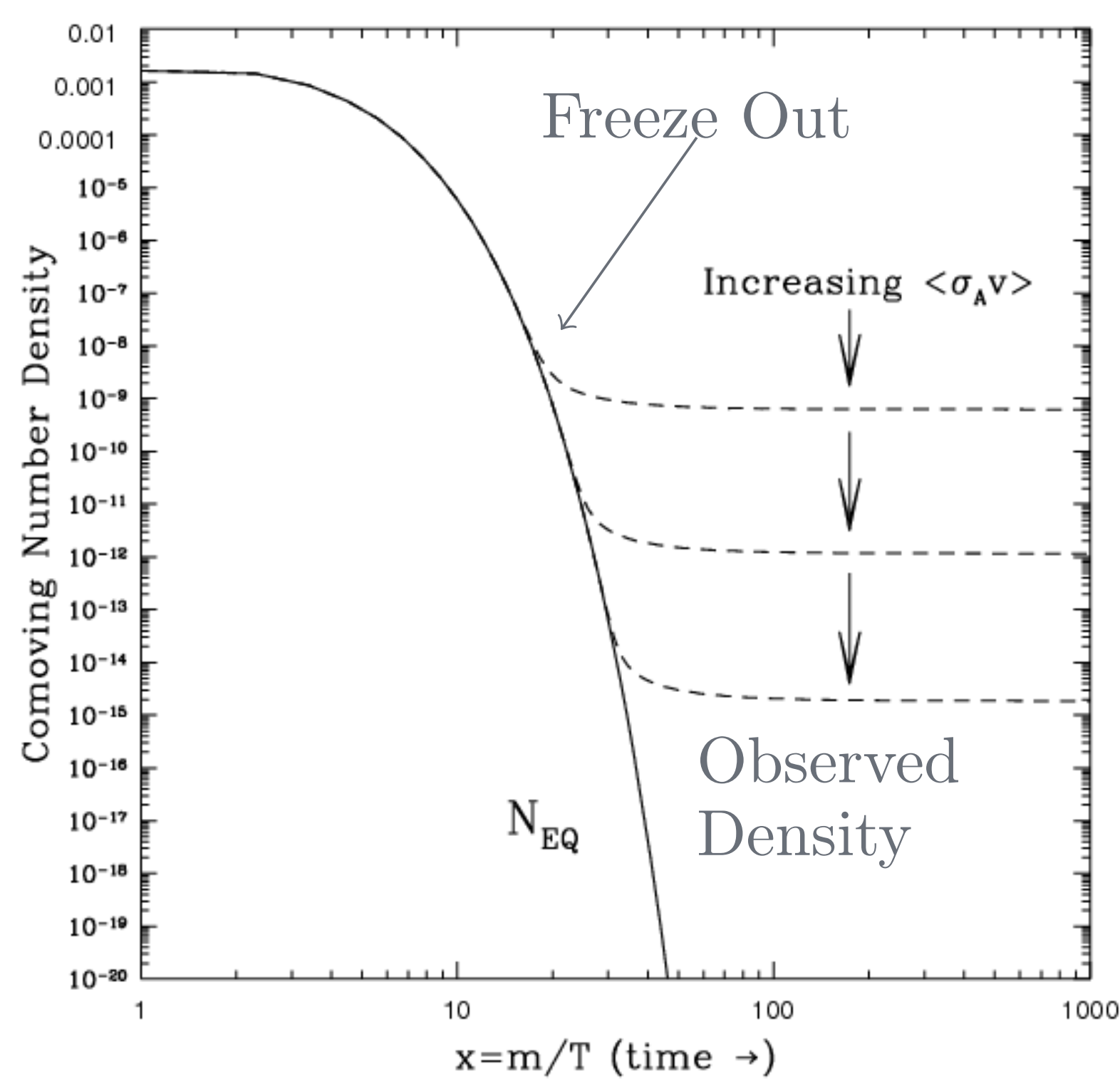


LDMX

Dark Matter

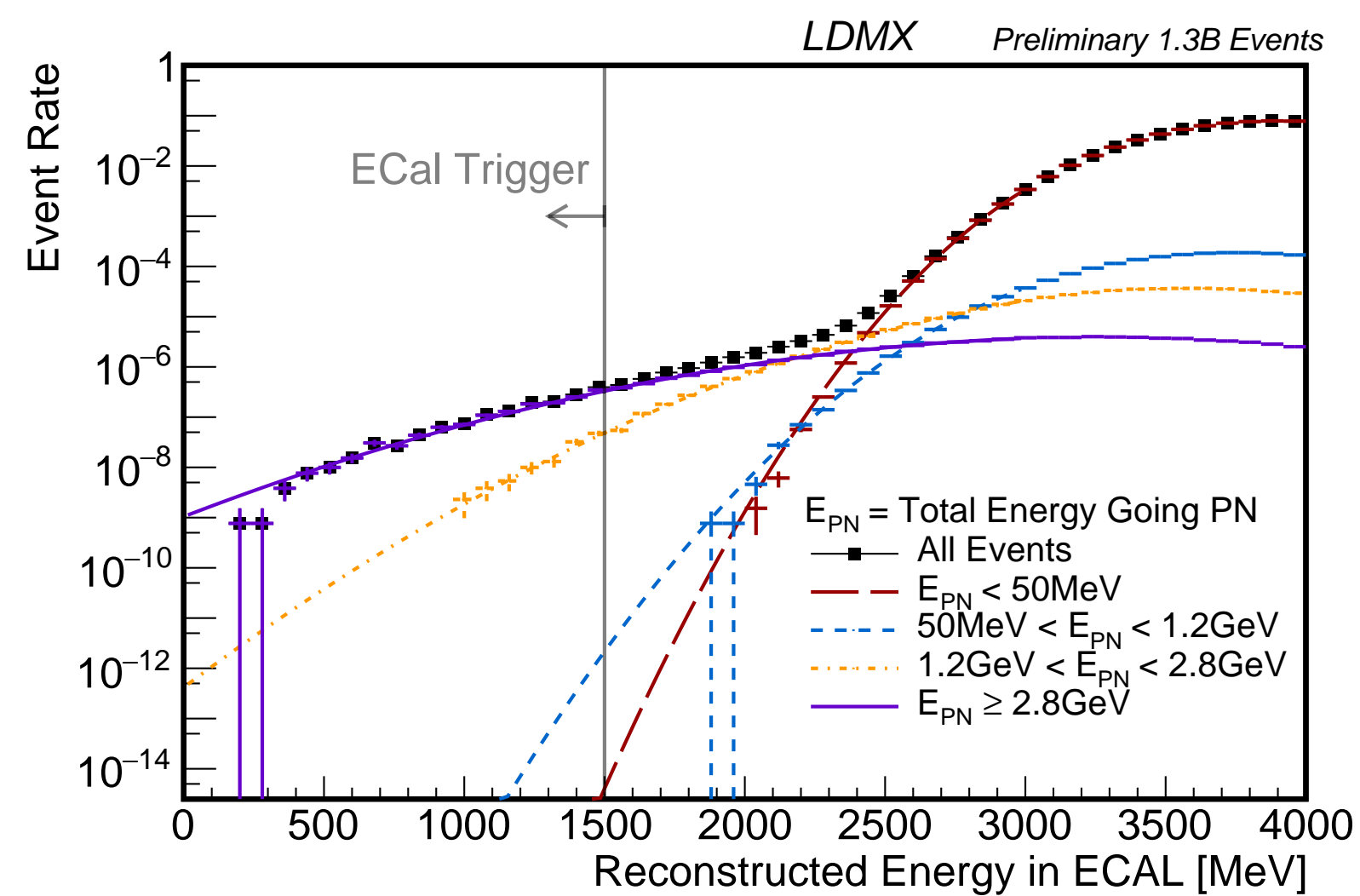


Light Dark Matter

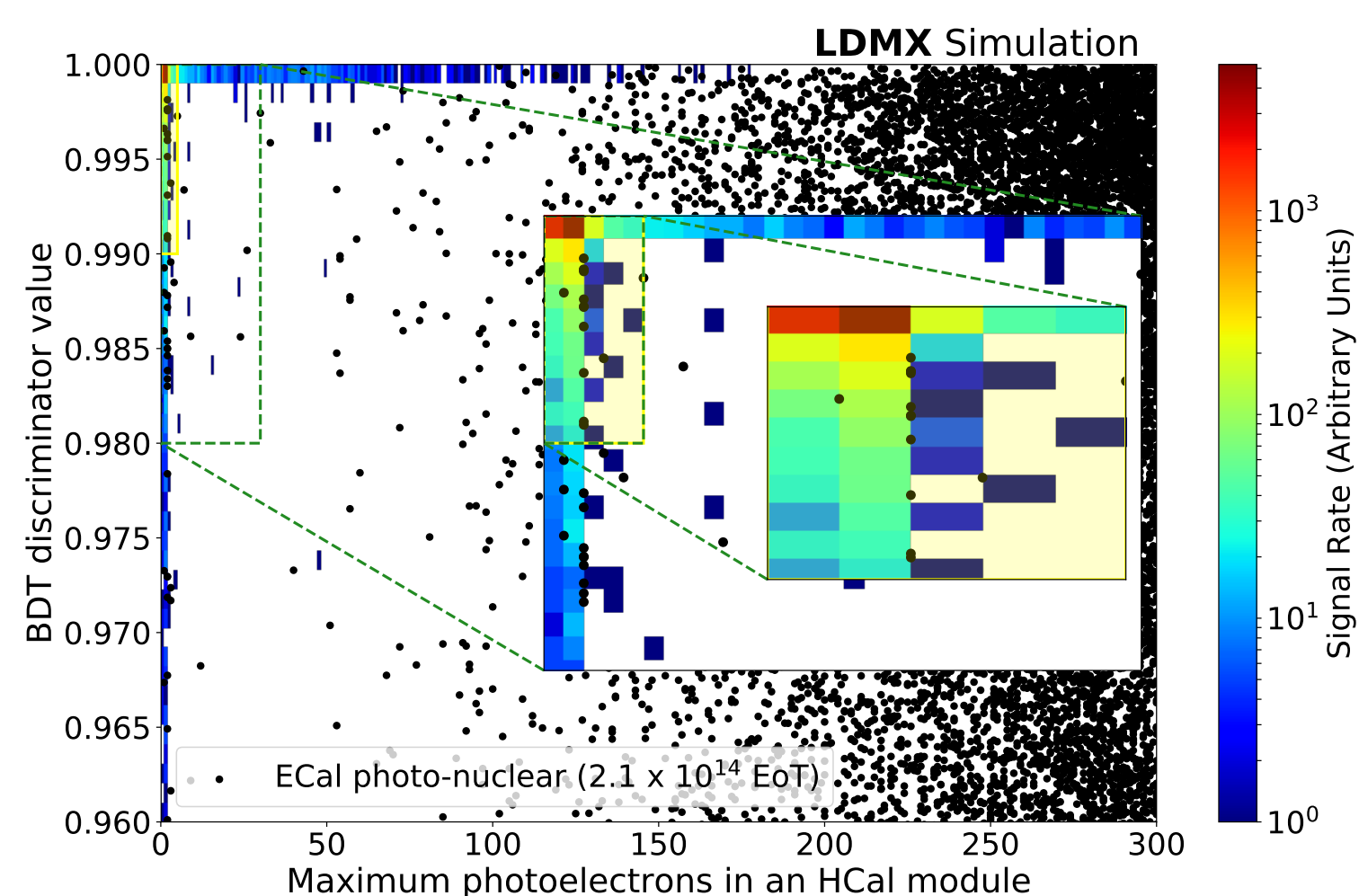


PhotoNuclear Background

The **PhotoNuclear** (PN) Background presents a unique challenge for LDMX.

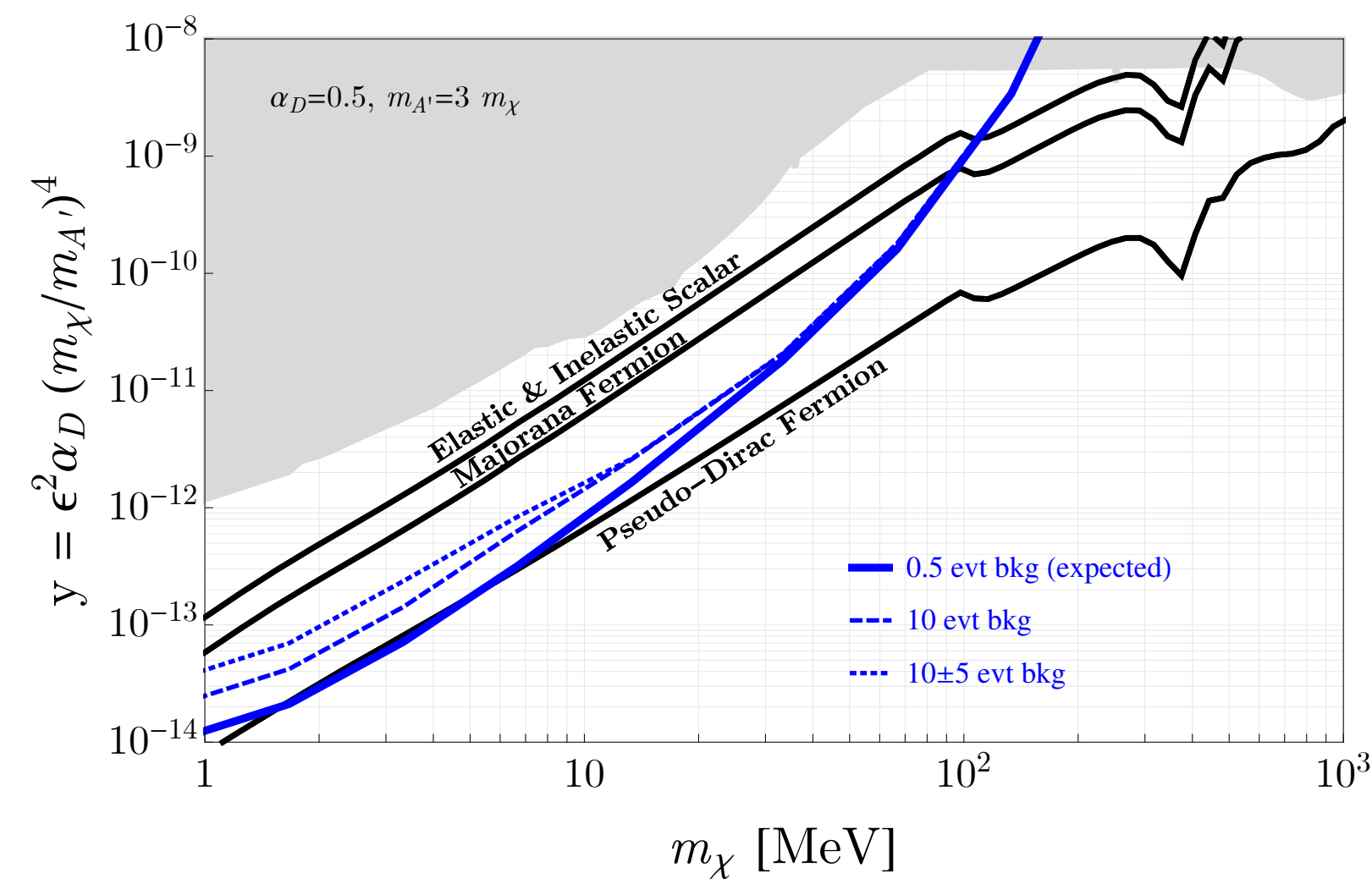


But the ECal and HCal are able to separate almost all PN events from signal.

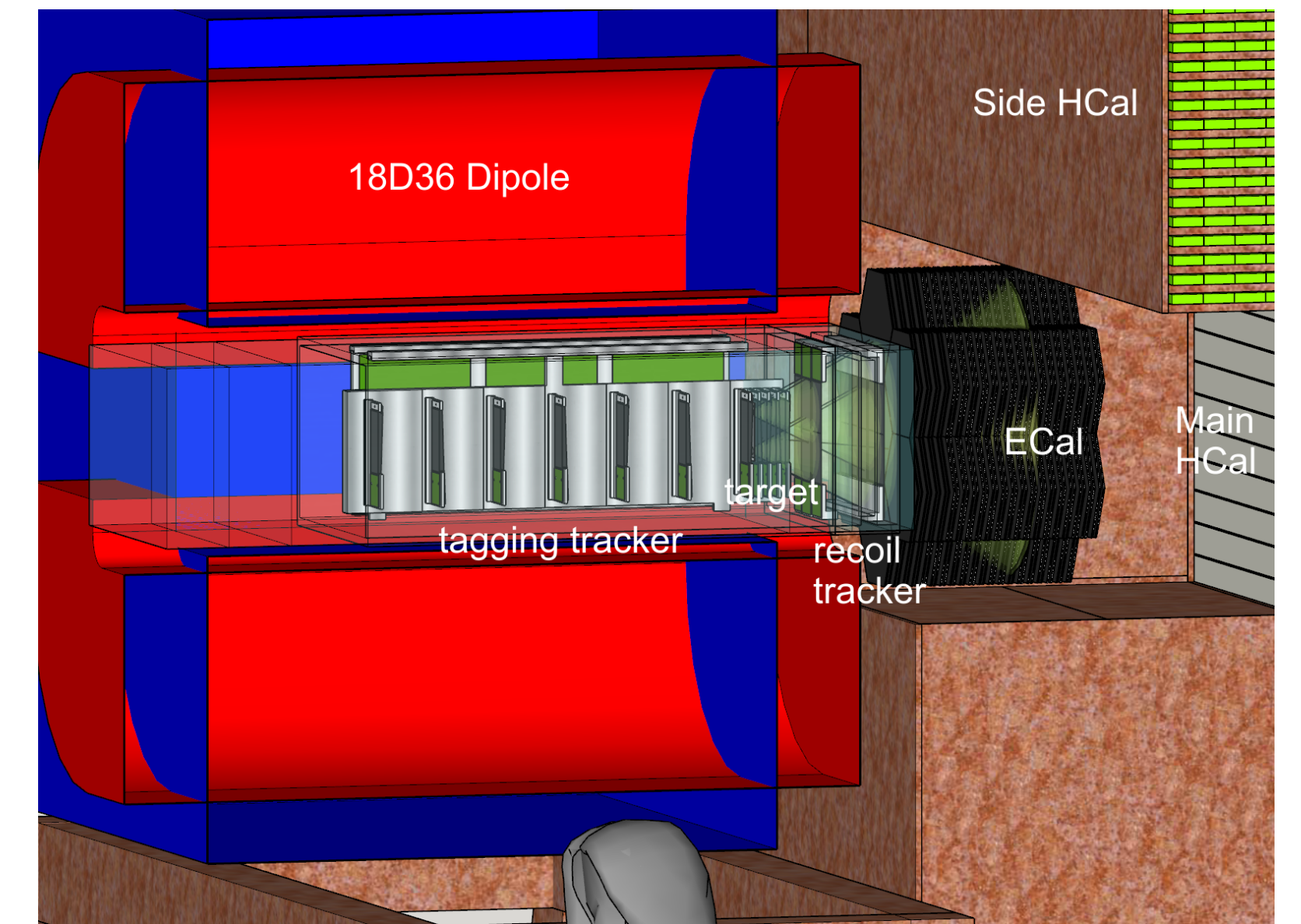


Experiment Description

The **L**ight **D**ark **M**atter **eX**periment (LDMX) aims to search a previously uninvestigated region of phase space for possible dark matter in the sub-GeV mass range.

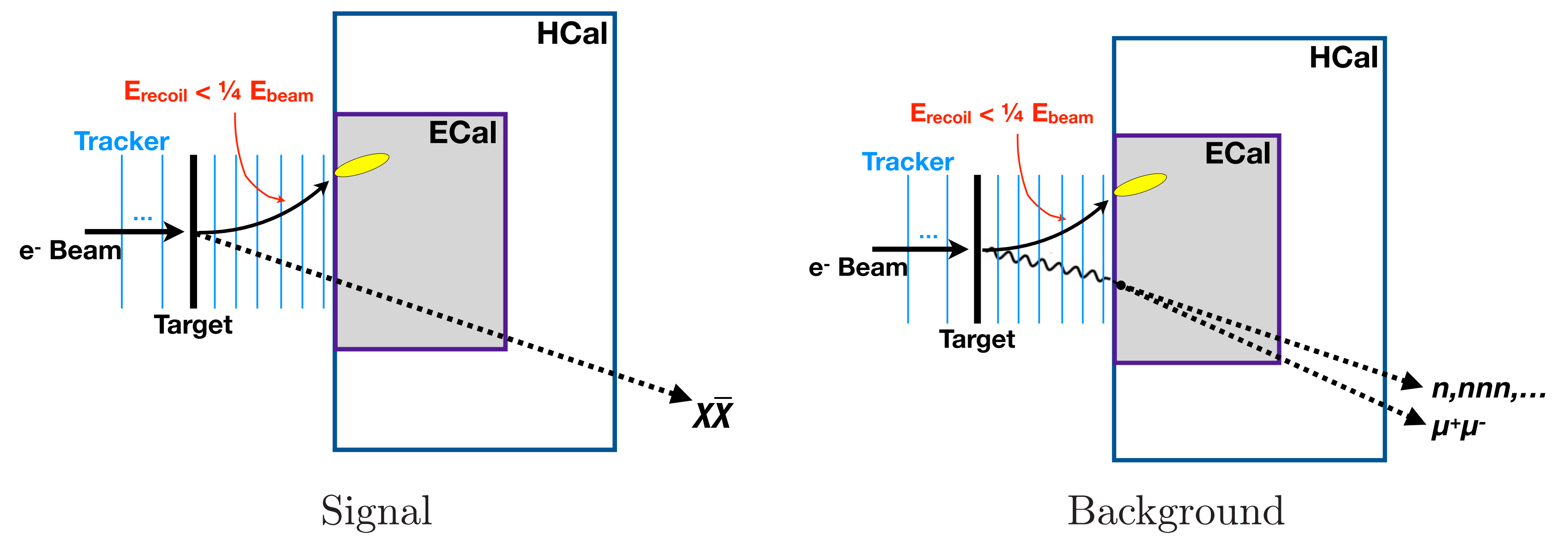


LDMX Design



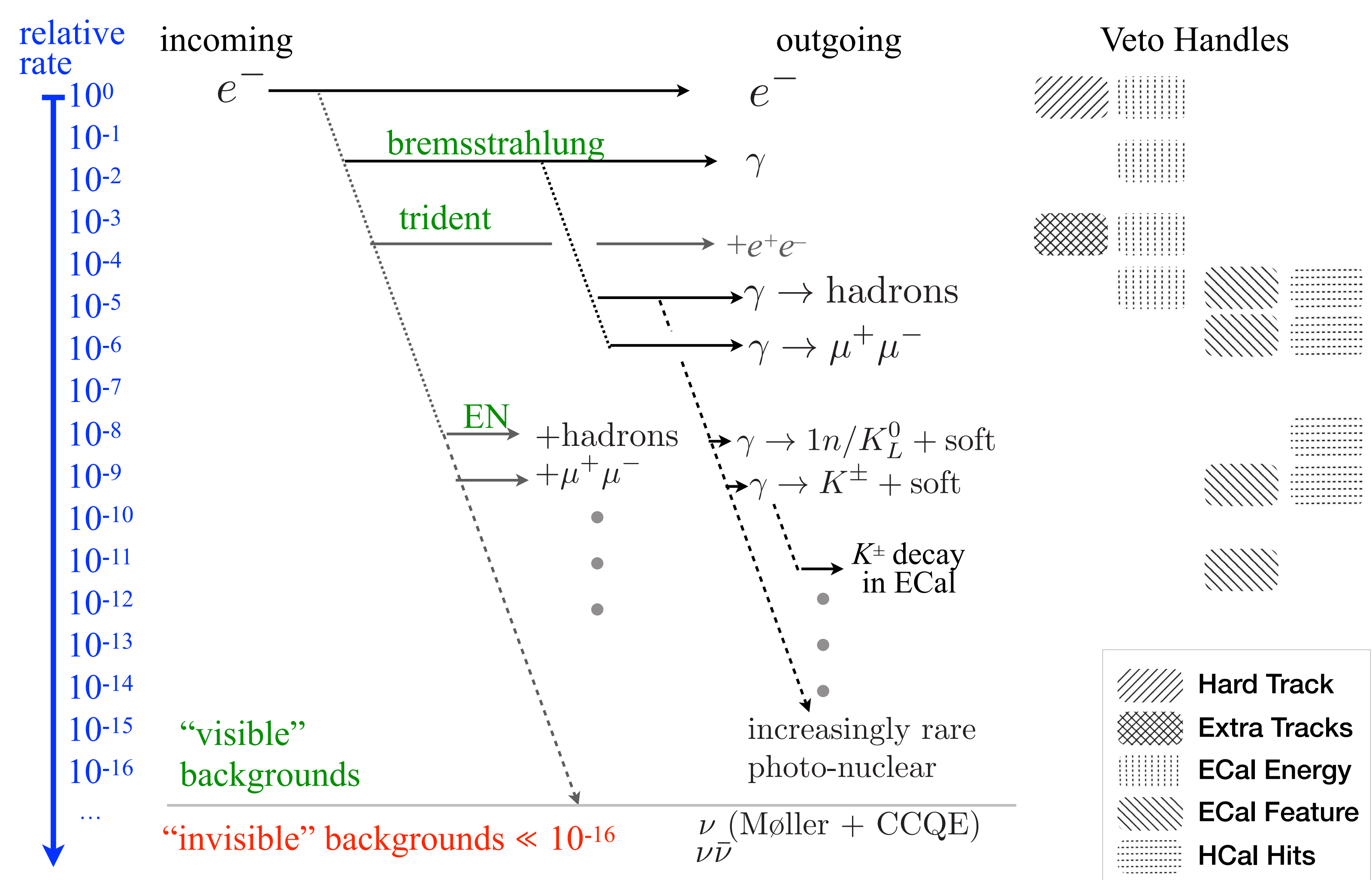
Specifically designed to measure any **missing momentum**.

Graphical Depiction of LDMX Response



Main Backgrounds

List of main backgrounds that LDMX expects to observe in order of relative rate. Each of the backgrounds also has at least one corresponding veto handle that is expected to catch it.



Conclusion

LDMX is a missing momentum experiment that is capable of detecting **C**old **T**hermal **R**elic **D**ark **M**atter (CTRDM) that has a mass in the sub-GeV range. This simple design only relies on the dark matter having a thermal origin, so LDMX is able to test various origin theories for CTRDM at once. In addition, if several events with missing momentum are observed, LDMX has the capability to estimate the value for the mass of the dark matter.

References

- Åkesson et. all, *A High Efficiency Photon Veto for the Light Dark Matter eXperiment*, 2019. <https://arxiv.org/abs/1912.05535>
- Åkesson et. all, *Light Dark Matter eXperiment (LDMX)*, 2018. <https://arxiv.org/abs/1808.05219>
- Mans, Jeremiah, *The LDMX Experiment*, 2017. <https://inspirehep.net/record/1592466>