

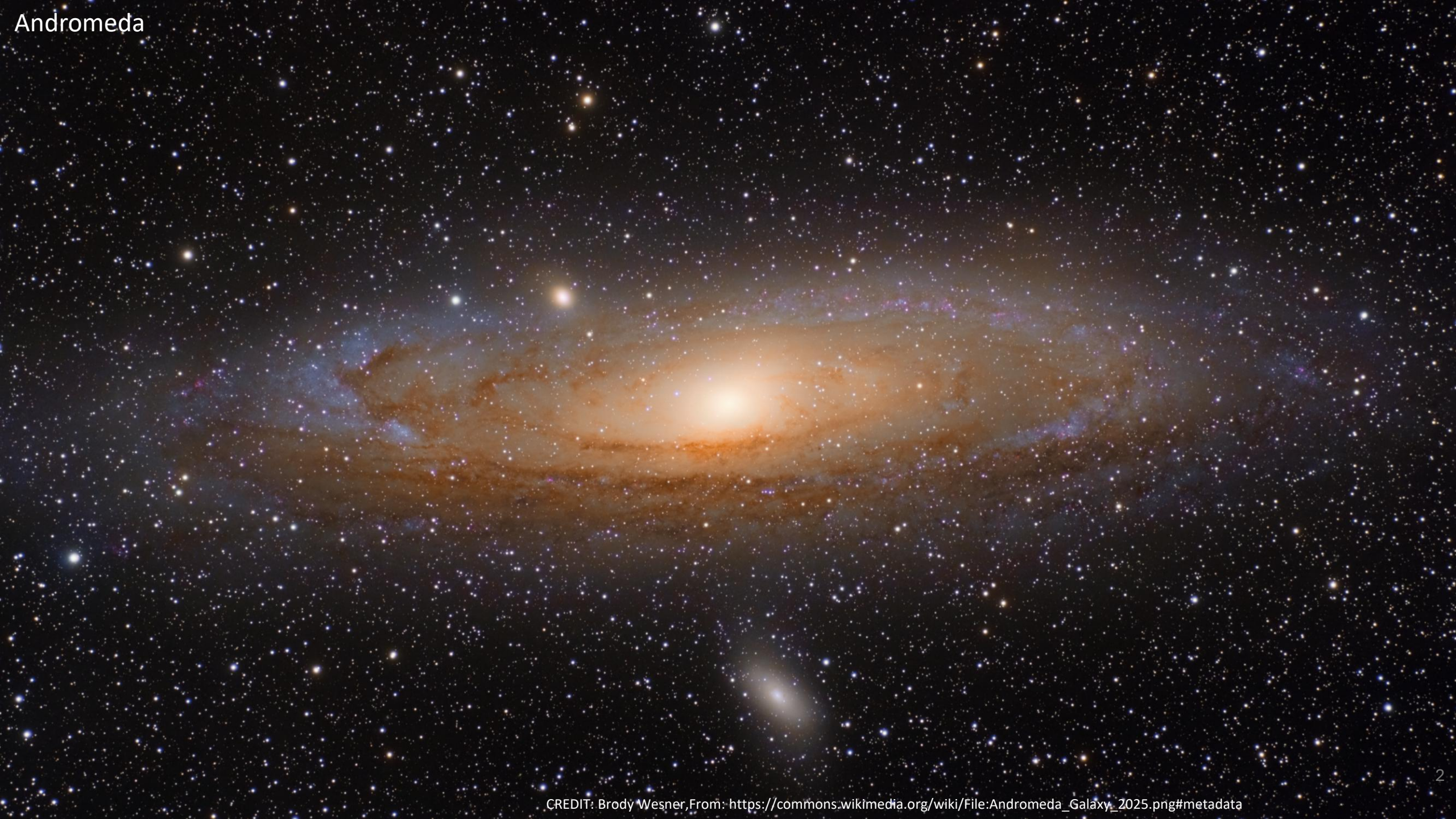


LUND
UNIVERSITY

How to shorten the time it takes to detect dark matter.

HANS ALIN, LUND UNIVERSITY



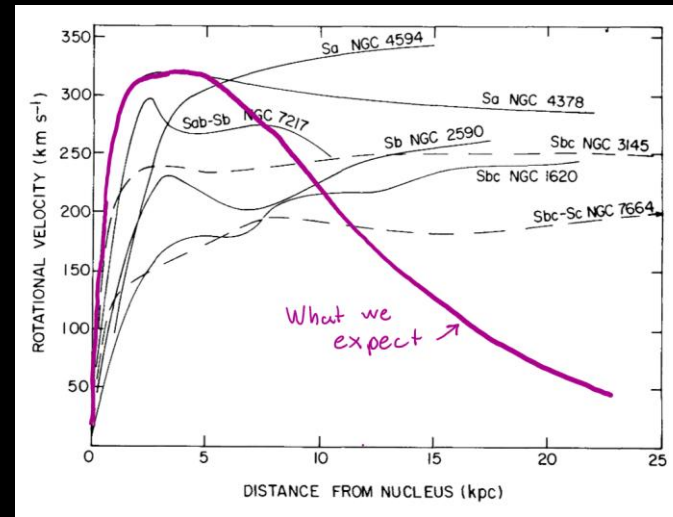


Andromeda

Coma Cluster



CREDIT: NASA, ESA, and the Hubble Heritage Team (STScI/AURA); Acknowledgment: D. Carter (Liverpool John Moores University) and the Coma HST ACS Treasury Team



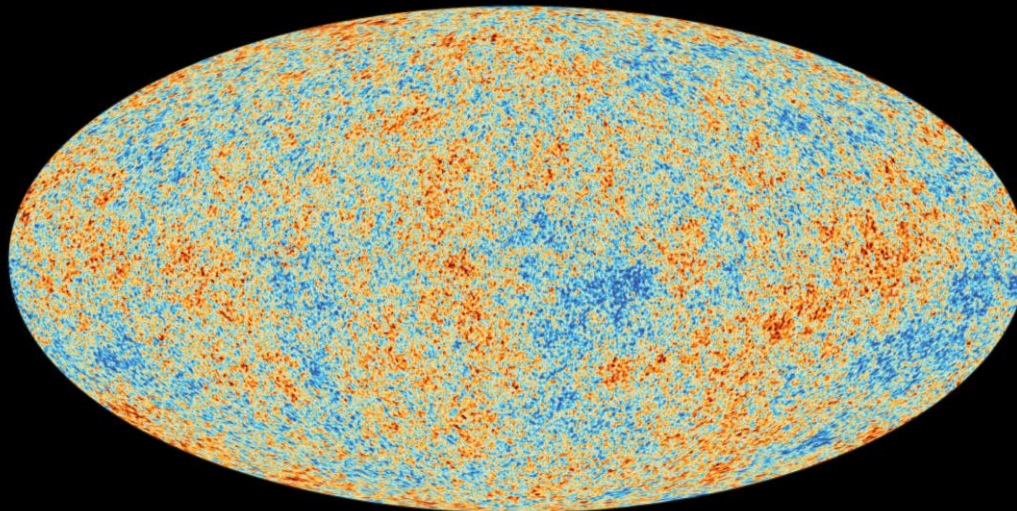
From: EXTENDED ROTATION CURVES OF HIGH-LUMINOSITY SPIRAL GALAXIES. IV. SYSTEMATIC DYNAMICAL PROPERTIES, Sa⁺Sc

NGC 4378

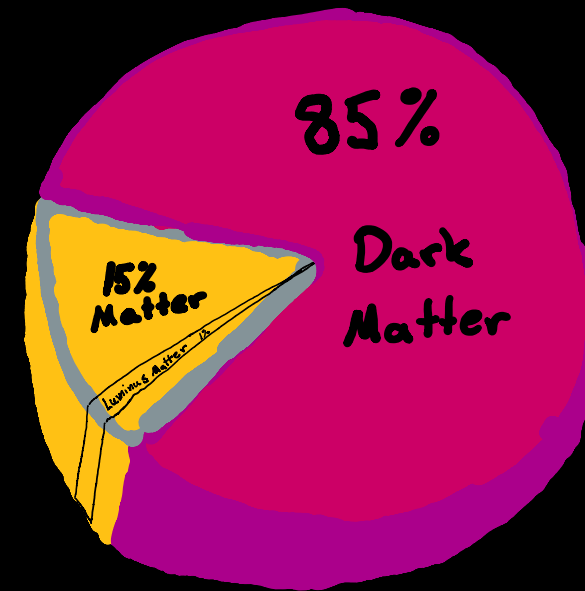


CREDIT: NSF-DOE Vera C. Rubi

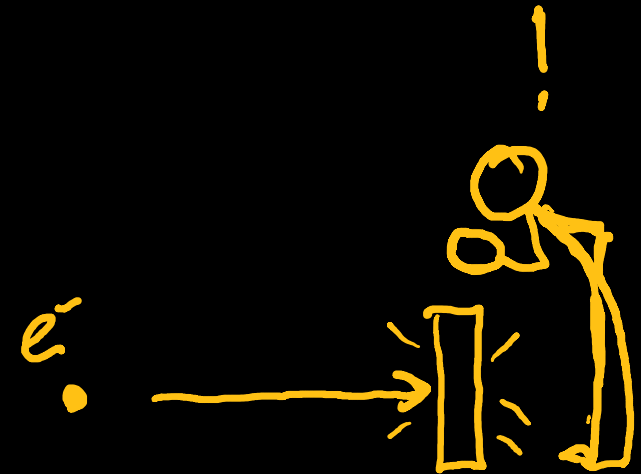
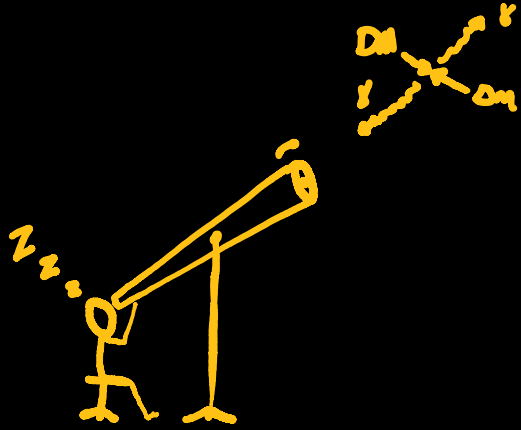
Cosmic Microwave Background radiation CMB



CREDIT ESA and the Planck Collaboration 2018

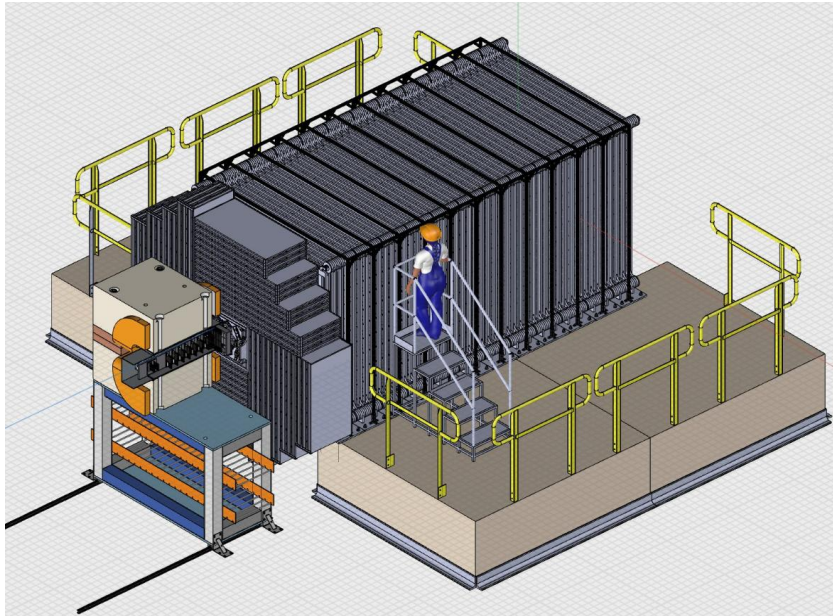


How To Search?



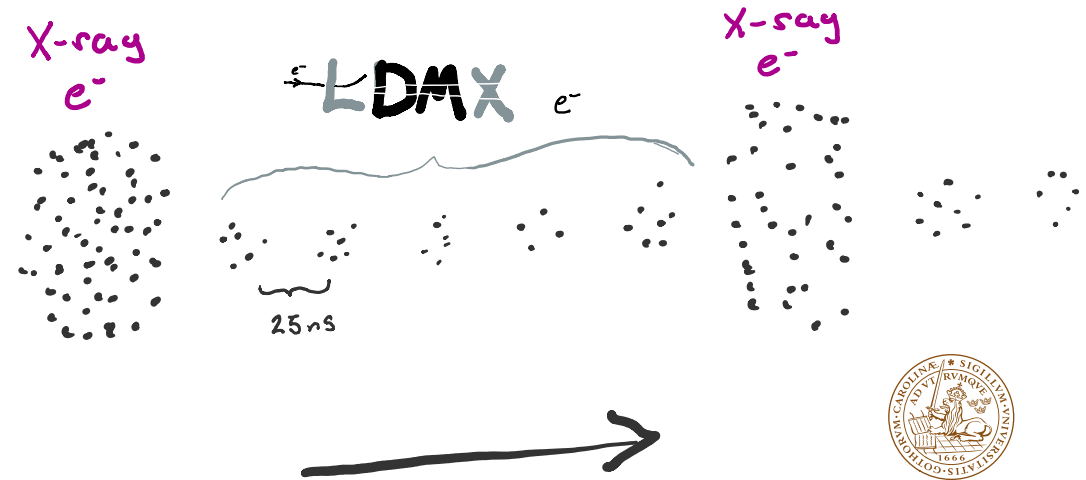
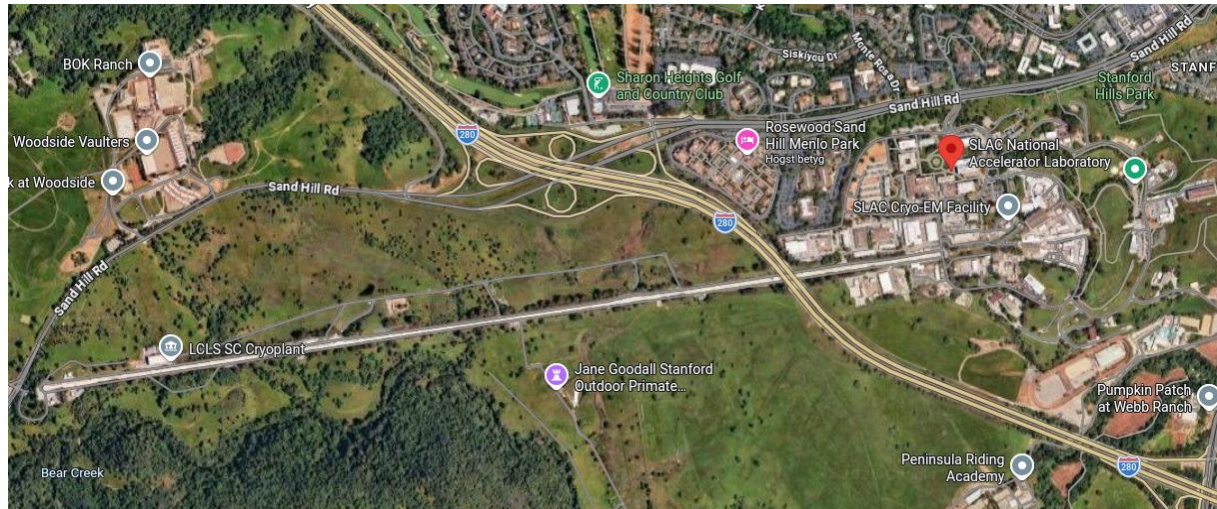
Particles?
Only Gravity?





LDMX

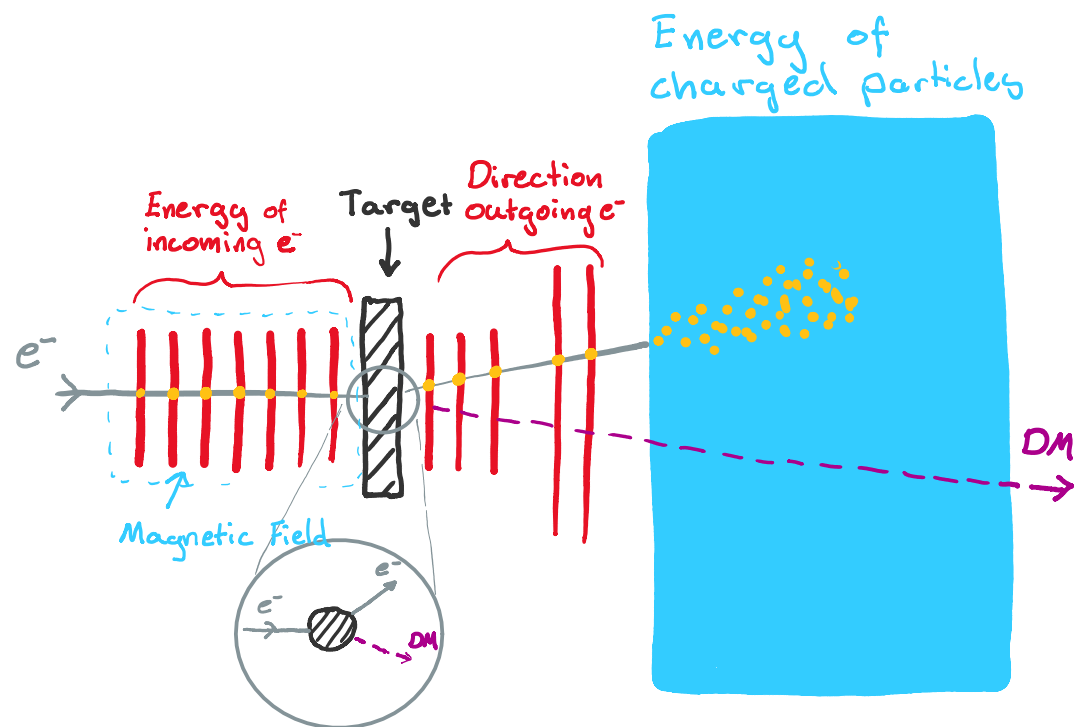
End Station A (ESA) at SLAC



LUND
UNIVERSITY

LDMX

Signal

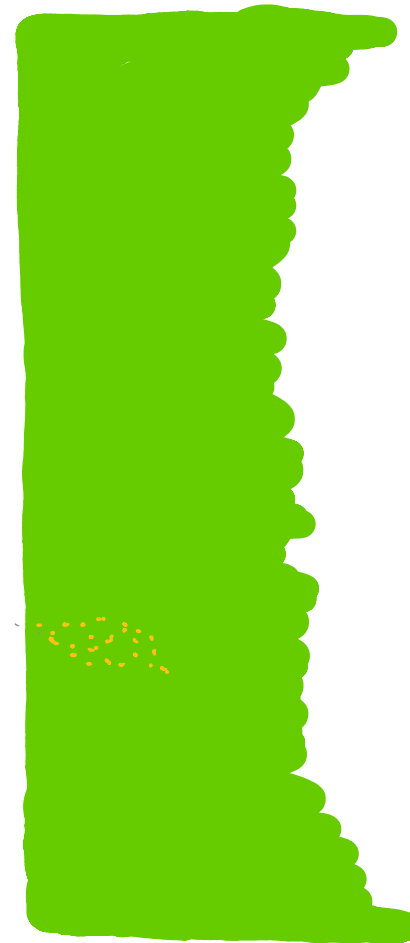
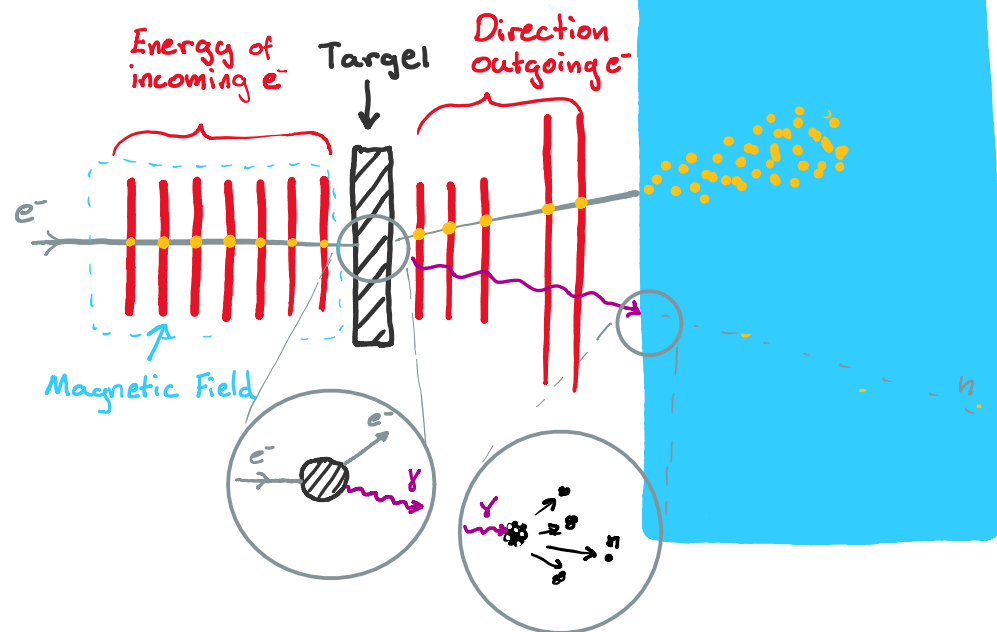


LDMX

Energy of
neutral particles

Background

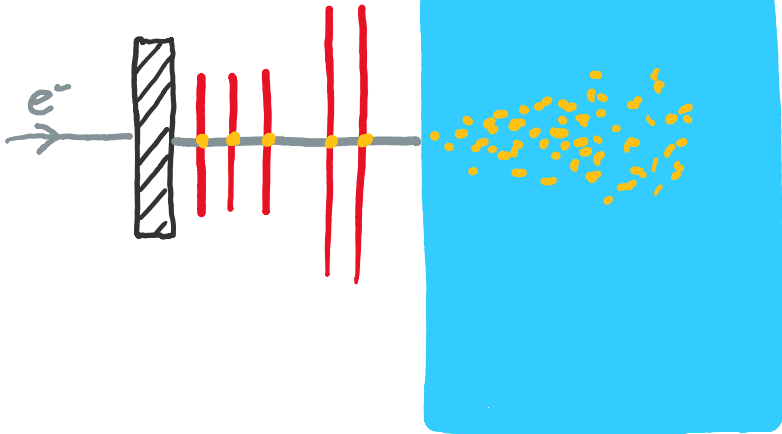
Energy of
charged particles



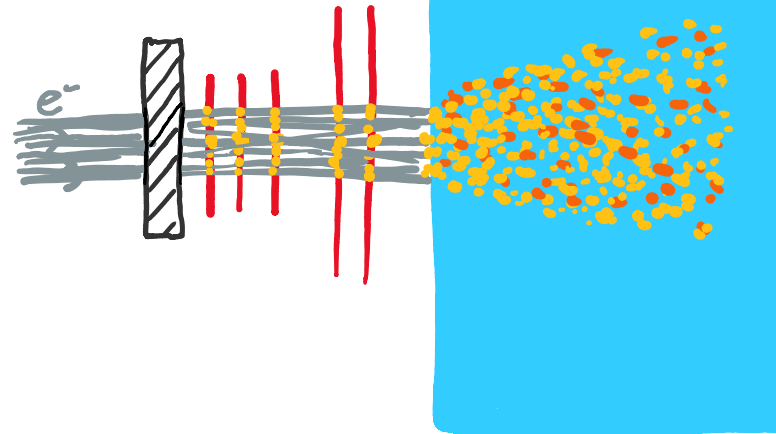
→ LDMX

- Get DM unlikely $\sim < \frac{1}{10^4}$
- LDMX aim for 10^{16}
- Exposure time / read out window } 25 ns
- Mean = 1, Max = 1 $\Rightarrow$ 50 years
- Mean = 2.2, Max = 4 $\Rightarrow$ 10 years

Easy

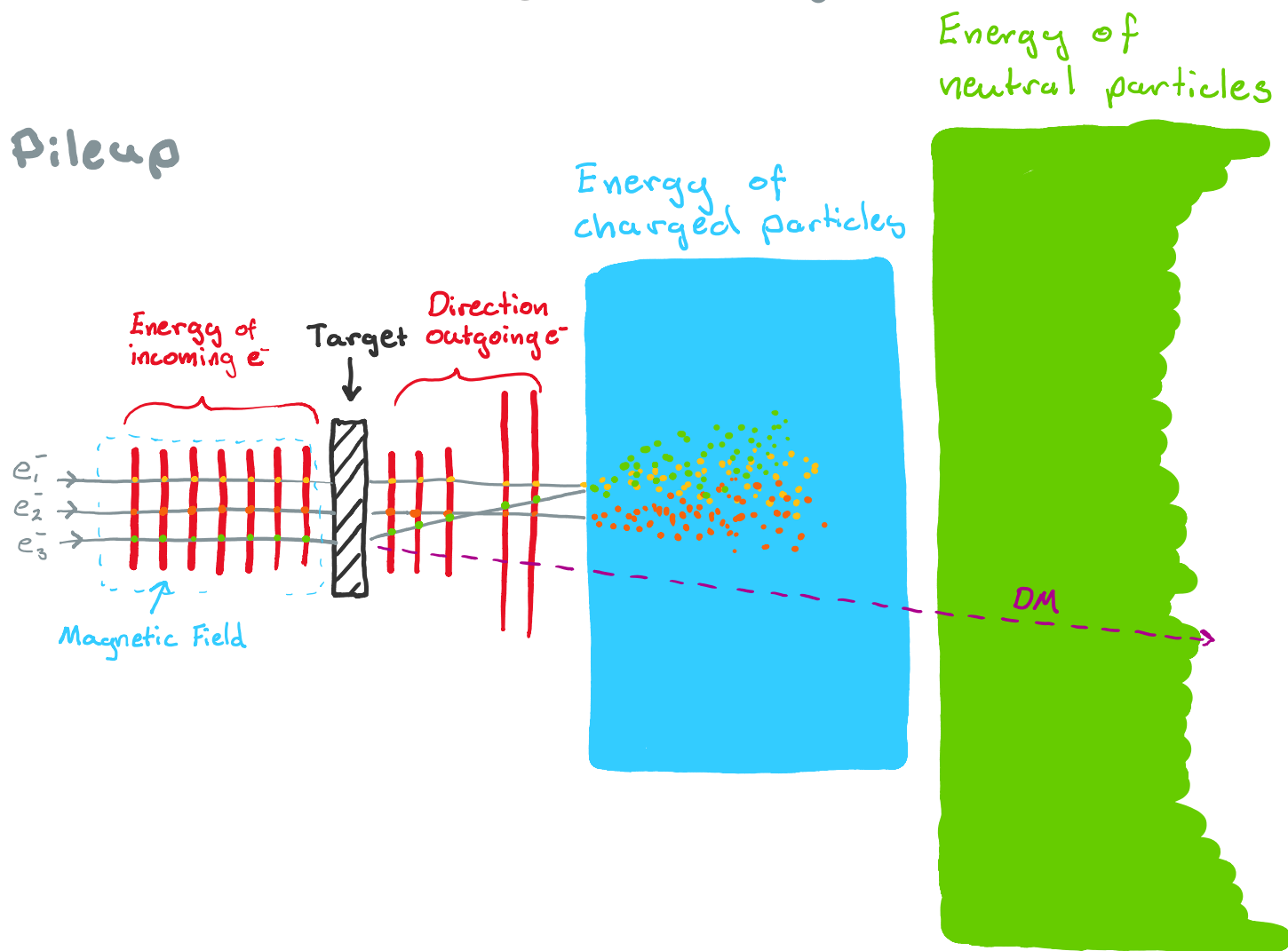


Hard



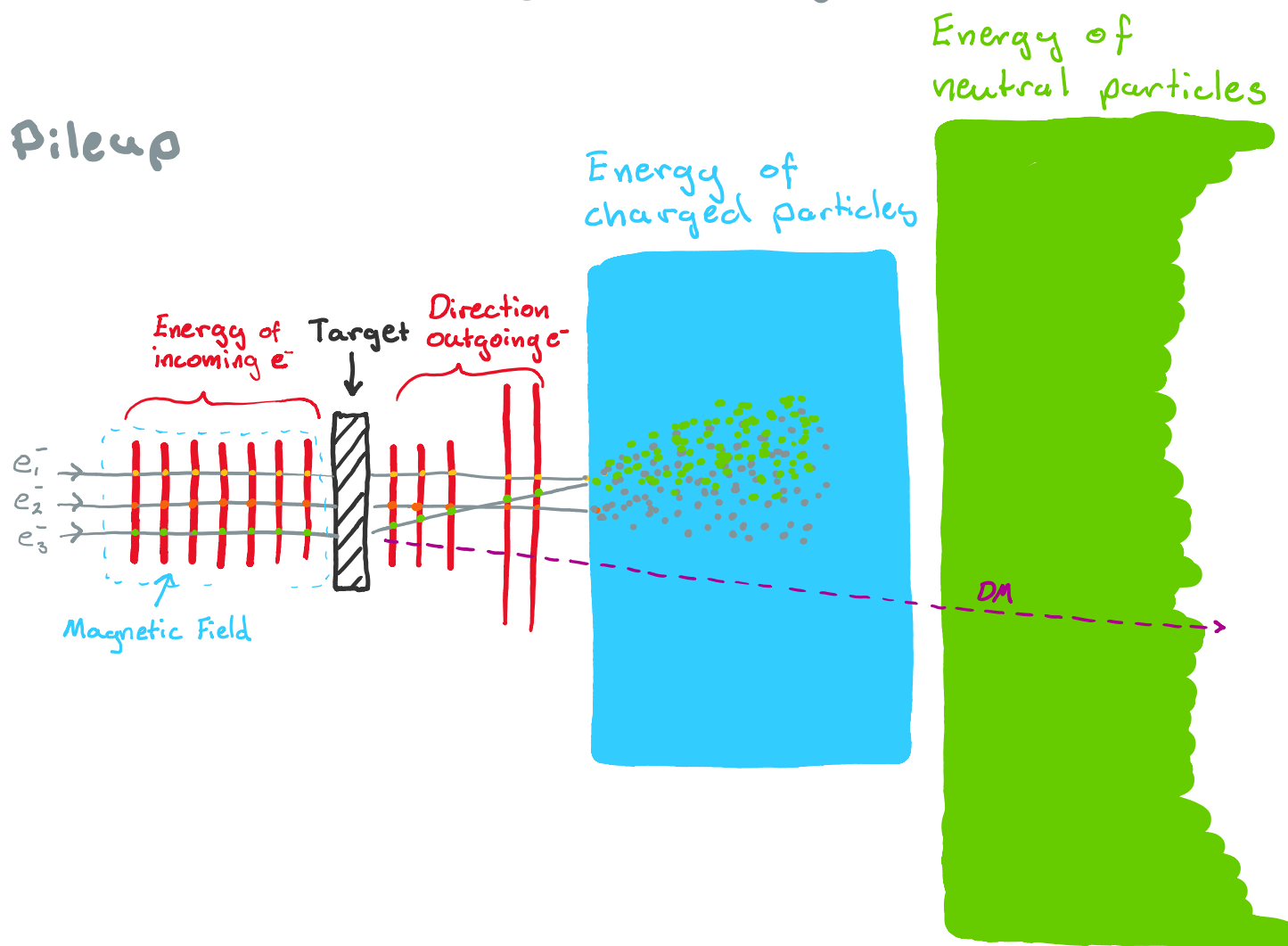
LDMX

Pileup

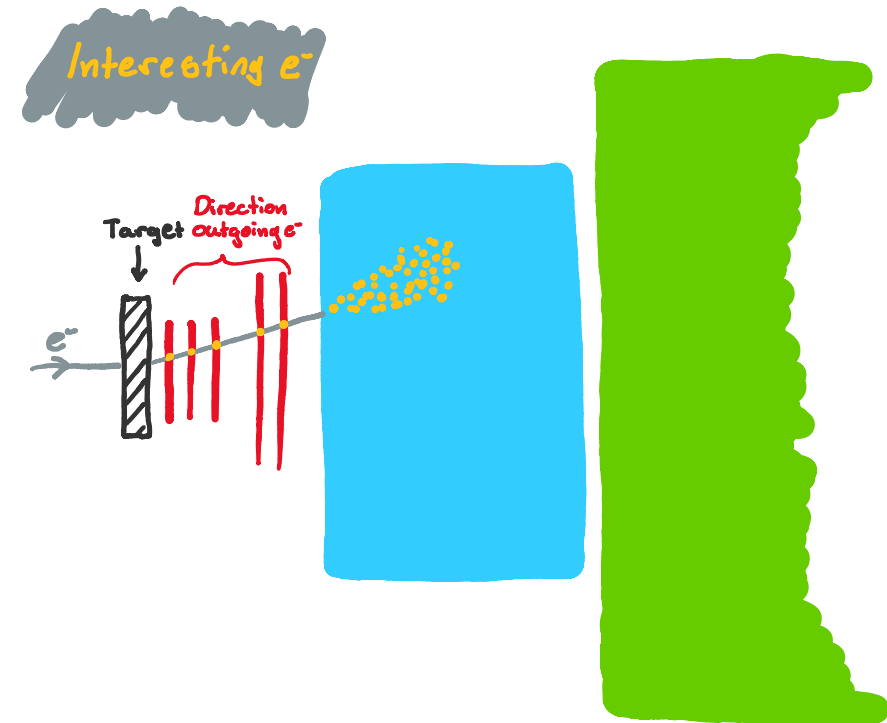
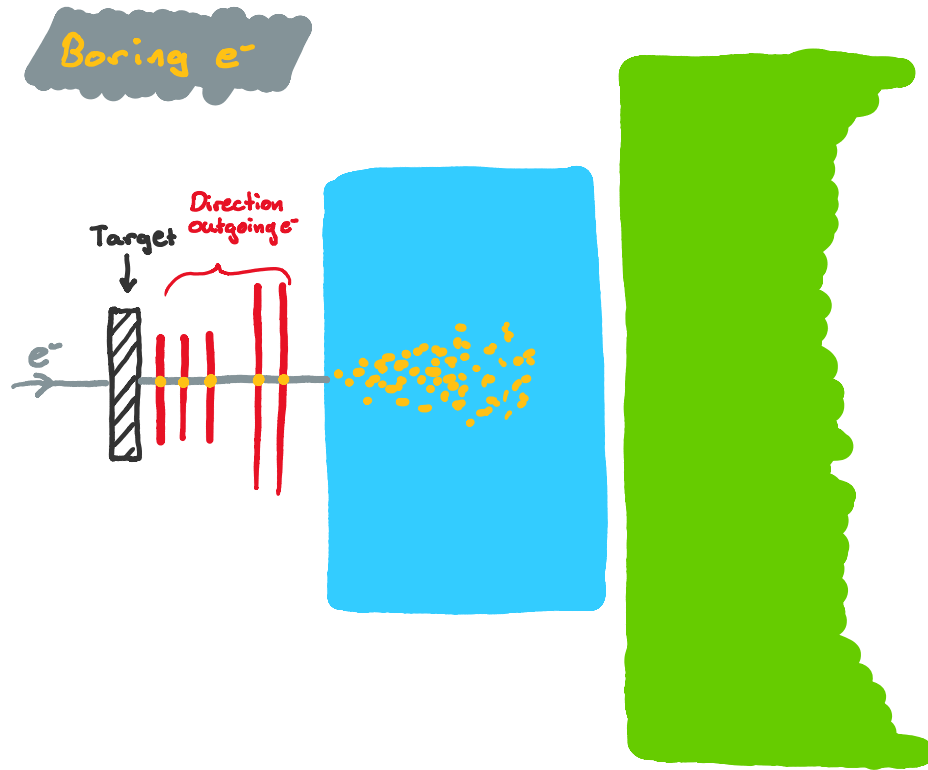


→ LDMX

Pileup

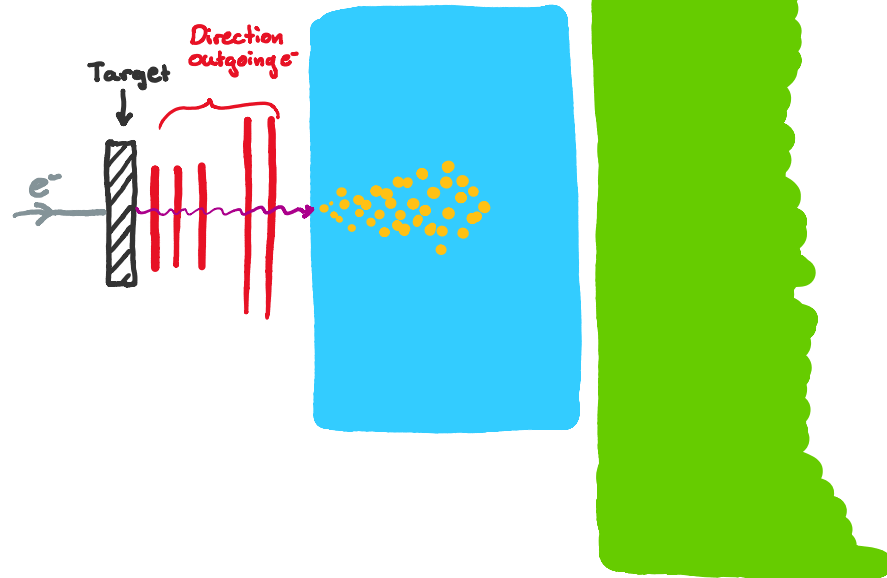


→ LDMX

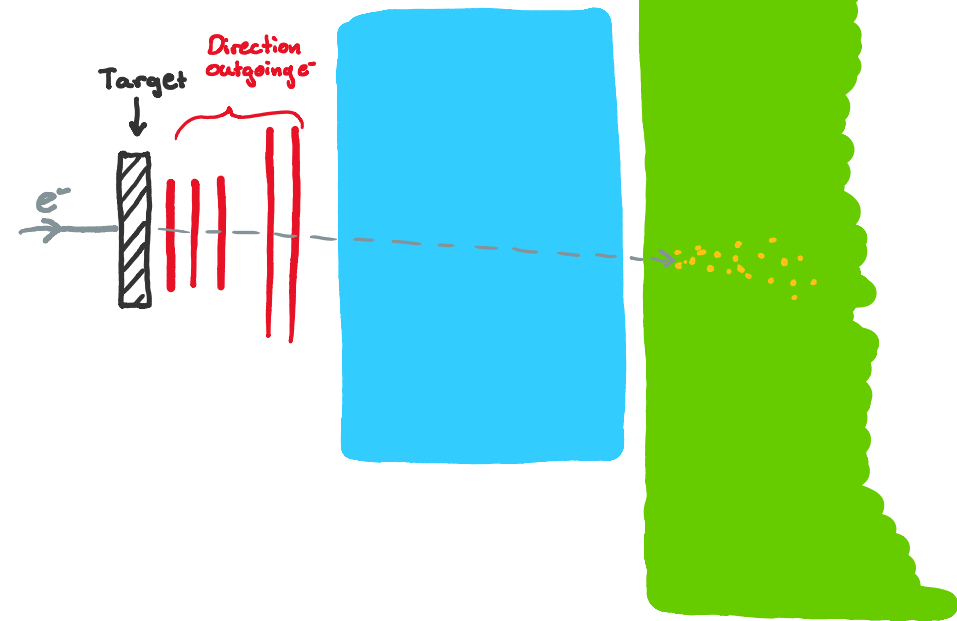


→ LDMX

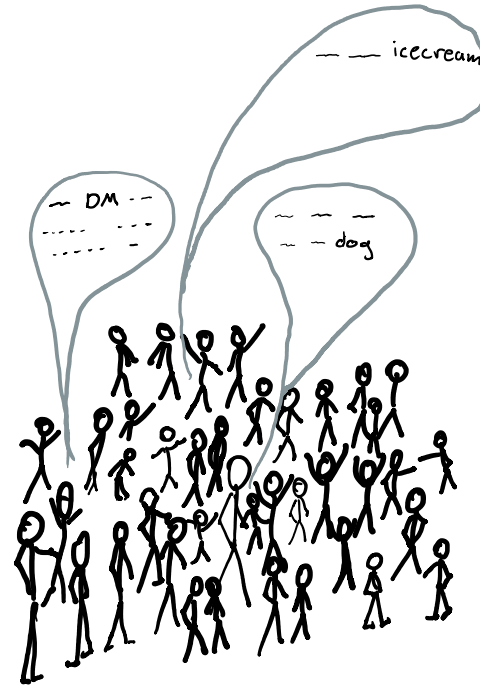
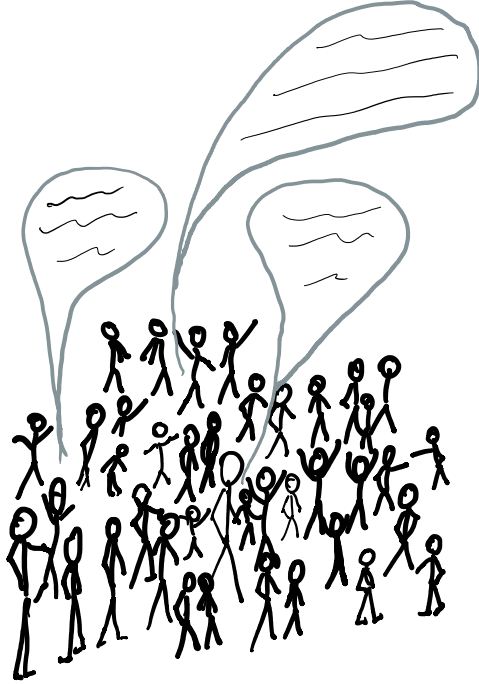
Photon γ



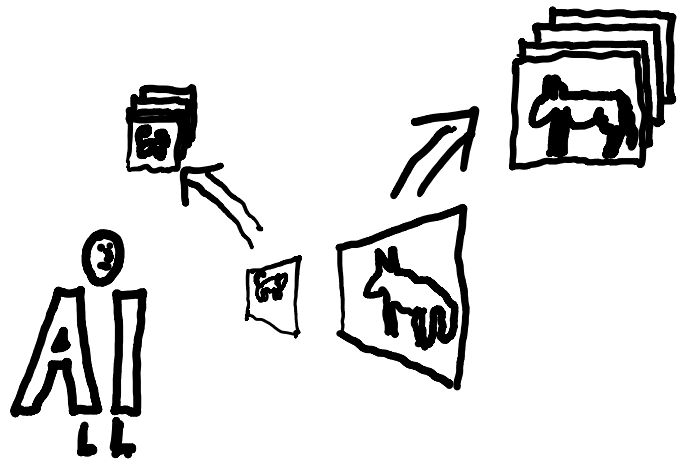
neutron n



→ LDMX



→ LDM X

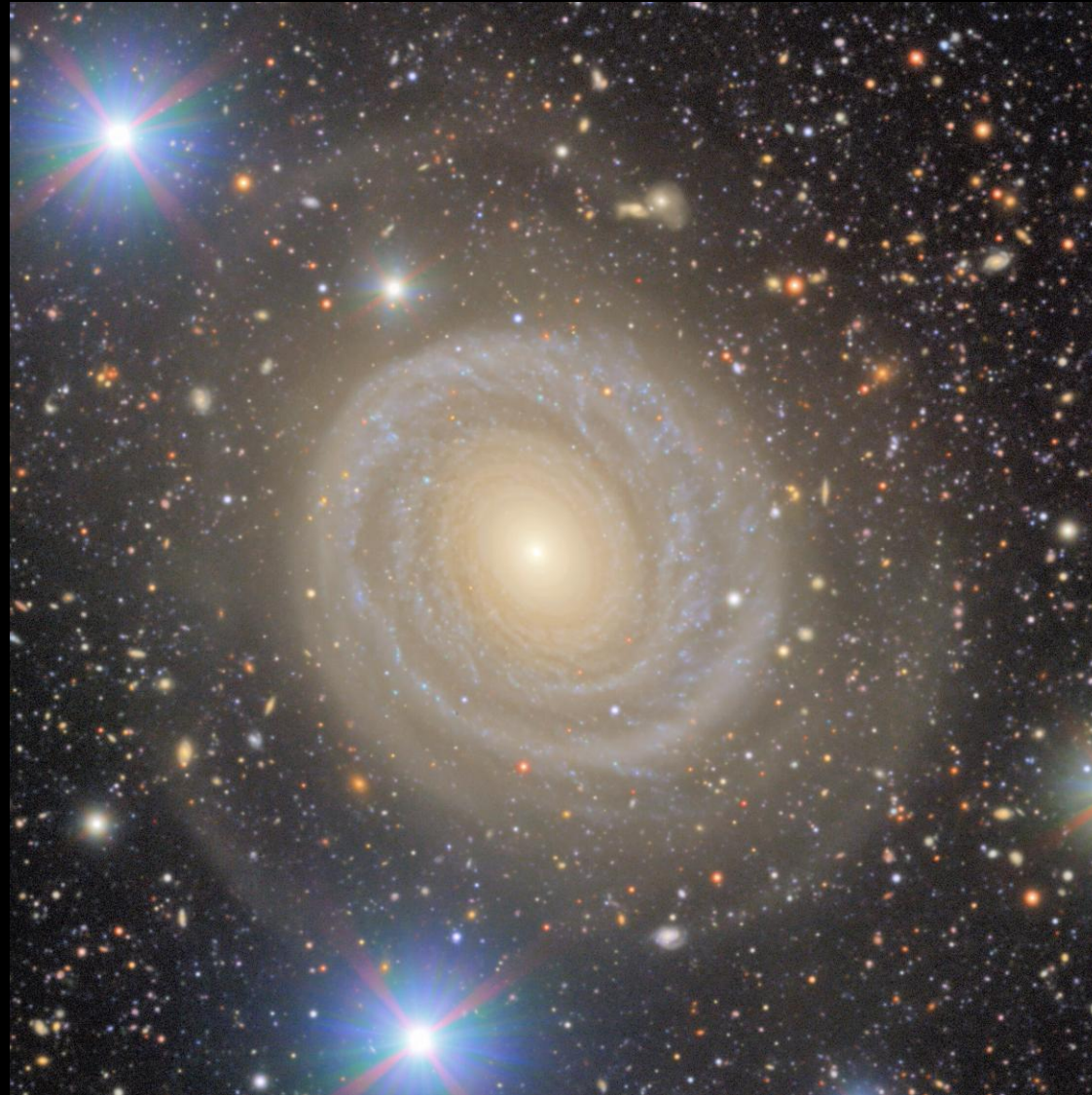


<https://www.britannica.com/story/are-dogs-smarter-than-cats#/media/1/2268527/355265ca>



LUND
UNIVERSITY

NGC 4378



CREDIT: NSF-DOE Vera C. Rubin Observatory



LUND
UNIVERSITY