THE SEARCH FOR DARK MATTER WITH XENON1T

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SYMBOLS

m mass

v velocity

ABBREVIATIONS

LXe	Liquid xenon
GXe	Gasseous xenon
TPC	Time projection chamber
WIMP	Weakly interacting massive particle
DM	Dark matter
LNGS	Laboratori Nazionali del Gran Sasso

ABSTRACT

Masson, Darryl PhD, Purdue University, May 2018. The Search for Dark Matter with XENON1T. Major Professor: Rafael F. Lang.

Dark matter! We still don't know what it is.

1. The Case for Dark Matter

1.1 Evidence for Dark Matter

1.1.1 Galactic Rotation curves

1.1.2 Galaxy cluster dynamics

Bullet cluster

1.1.3 Gravitational lensing

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1.1.5 Cosmic Microwave Background (CMB)

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1.2 Dark Matter in the universe today

1.2.1 Weakly Interacting Massive Particles (WIMPs)

Freezeout and the WIMP Miracle

1.2.2 Massive Compact Halo Objects (MACHOs)

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4. Single Electrons and UA'(1)

Slightly modified UA'(1) proposal.