

Theory Motivation for MET



Martin Schmaltz

Boston University

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Why E_t ?

Martin Schmalz
Boston University

E_t workshop, UC Davis, March 27/28 2009

it's the signal for

SUSY

but there are more general
reasons!

Dark Matter

Fact: a stable, neutral particle with mass $\approx M_{\text{weak}}$ has correct thermal abundance to be DM.

Assume: no accident, e.g. DM = WIMP

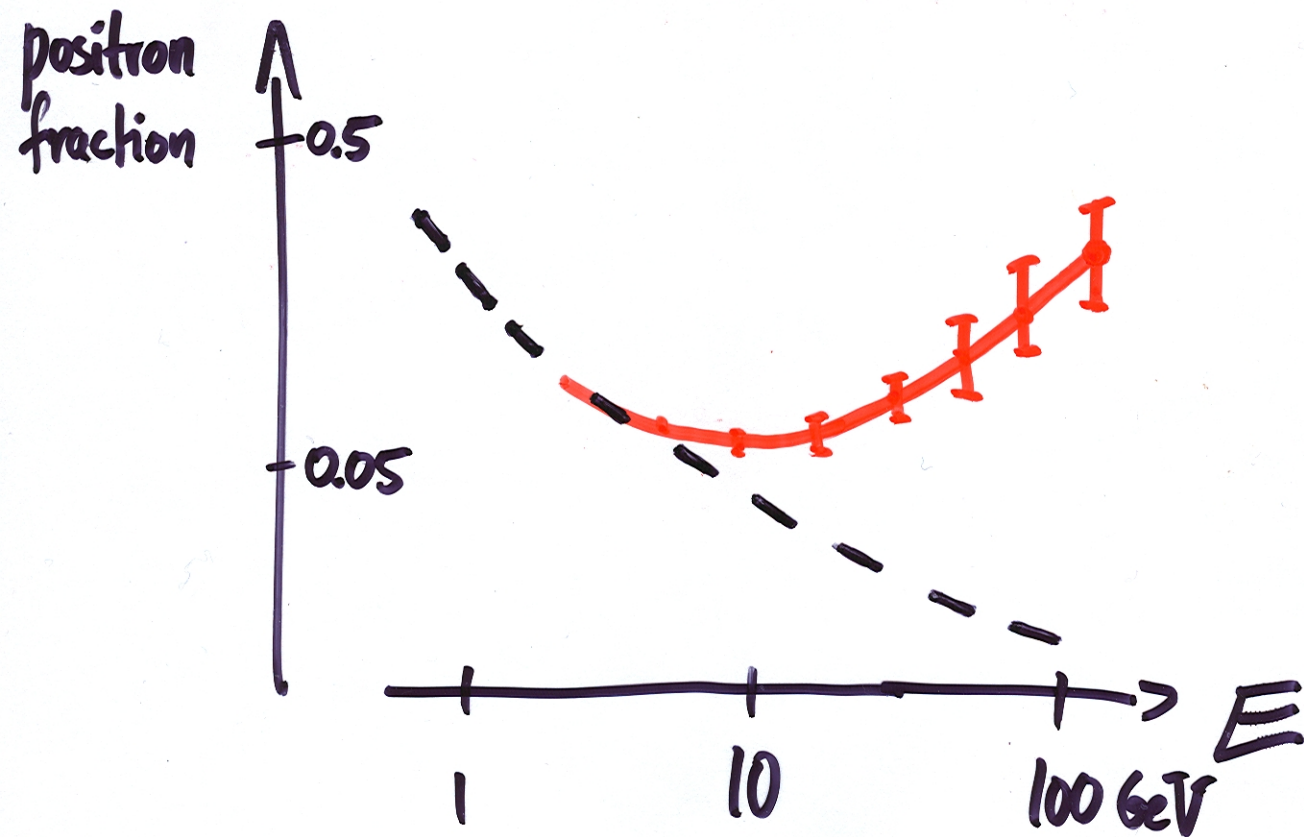
naturalness: couples to Standard Model

\Rightarrow produced at LHC

\Rightarrow $\frac{\dot{E}_t}{t}$

Corroboration?

PAMELA



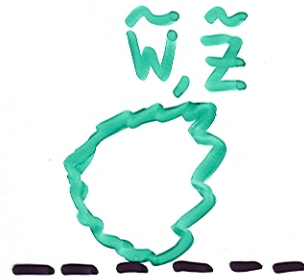
... DM decays into e^+e^- ? ...

Higgs Naturalness

quadratic divergences
in M_{Higgs}

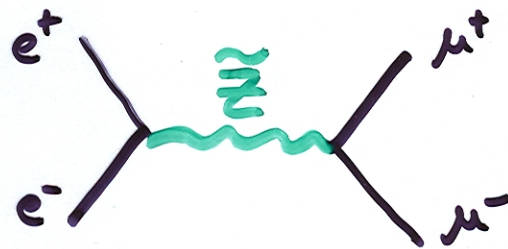


anceled by
loops of
New Physics



$$\rightarrow M_{\text{N.P.}} \lesssim 1 \text{ TeV}$$

Precision Measurements:



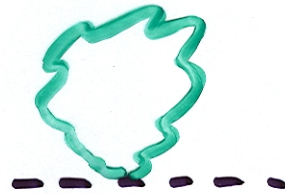
$$\rightarrow M_{\text{N.P.}} \gtrsim 5 \text{ TeV}$$

conflict!

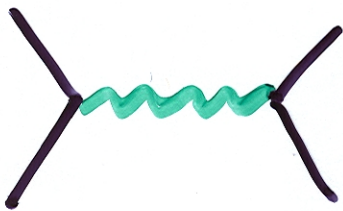
New Physics Parity

SM : even

NP : odd



allowed

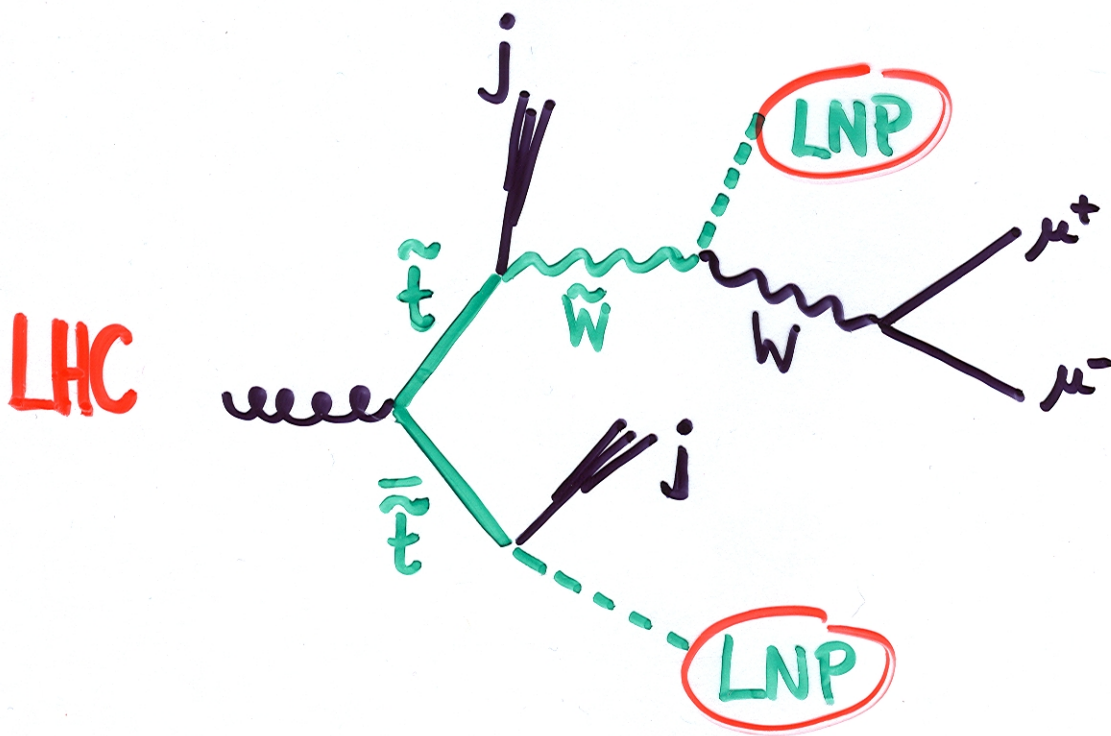


forbidden

New Physics Parity

lightest NP particle (LNP) stable

⇒ identify with DM



cascade decays \vec{E}_t

E_t well-motivated

Example models :

- SUSY
- Little Higgs w. T parity
- UED
- LED
-

value of models

- 😊 concrete
- 😊 might be correct
- 😊 parametrization of signature space

trouble with models

- 😞 hidden model arbitrariness
- 😞 all known models are fine-tuned
- 😞 incomplete param. of sig. space

» model-independent analyses «

E_t signature space

