

6/12/17

Observational legs of our theoretical framework

e^\pm excess

- AMS-02, DAMPE, CALET "signal"
- Relatively easy to fit but so far we have implemented AMS-02 only.

• Typical channels

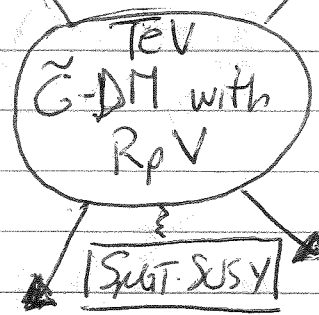
- $W\tau$, $\tau^+\tau^-V$ BF

- $e\mu\tau V \sim$ BF

What about BRP V
 $W\tau$, $W\mu$, etc

γ -ray observations

- Fermi-LAT, CTA?
- Relatively hard "constraints" although there are DM scenarios that claim compatibility
- 2 or 3 different approaches for analysis (German)



Tension mostly th.

ν -masses and angles

- RpV can account for Δm^2 and angles, however "Parameters" are too big to allow for lifetime requirements from e^\pm excess $\bar{P}_e < \bar{m}_\nu$
- Still we have to check for trilinears

- Possible avenue to explore (minimally) $E's$ because these do not affect \bar{P}_e but d.o.f < observables

- something else? e.g. Lorentz factor \leftrightarrow super velocity in structure formation

Colliders

- Basically unknown for us, except for this reference
1706.0841
R-nuity Violations of the LHC
43 pages

Tension \sim Complementarity ($E's$ or \hat{m} super big)

Questions

- Can we fit e^\pm excess without conflicting with γ -rays?
- Is it possible to explain e^\pm and neutrino obs. without extra ingredients or too much fine-tuning?
- How constrained is $\tilde{G} \Delta M \oplus R p V$ after considering these four observational legs?
- What is the impact of collider constraints on the rest of observables?

A potential impossibility to explain this e^\pm excess is in agreement with γ -rays suggest that the solution should consider modifications of cosmic Ray models.

Justification

(Why is this important?)

- Study the potential reach of experiments like AMS-02 and Fermi-LAT to constrain BSIT models

↳ Are they useful or the impact is mild?

- Reinforce the message that γ -ray observations are unavoidable to consider in any approach to explain e^\pm excess

↳ This is specially important nowadays since new e^\pm experiments are releasing exciting data

- Relation of our findings in the context of the question about the origin of cosmic Rays

↳ e^\pm excess is questioning the current models of CR propagation