Origin of Dark Matter

Manuel Drees

Bonn University & Bethe Center for Theoretical Physics

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External developments: Experiment

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- PAMELA, ATIC, Fermi/LAT "excesses" caused great deal of excitement!

Statistics of Network Activities

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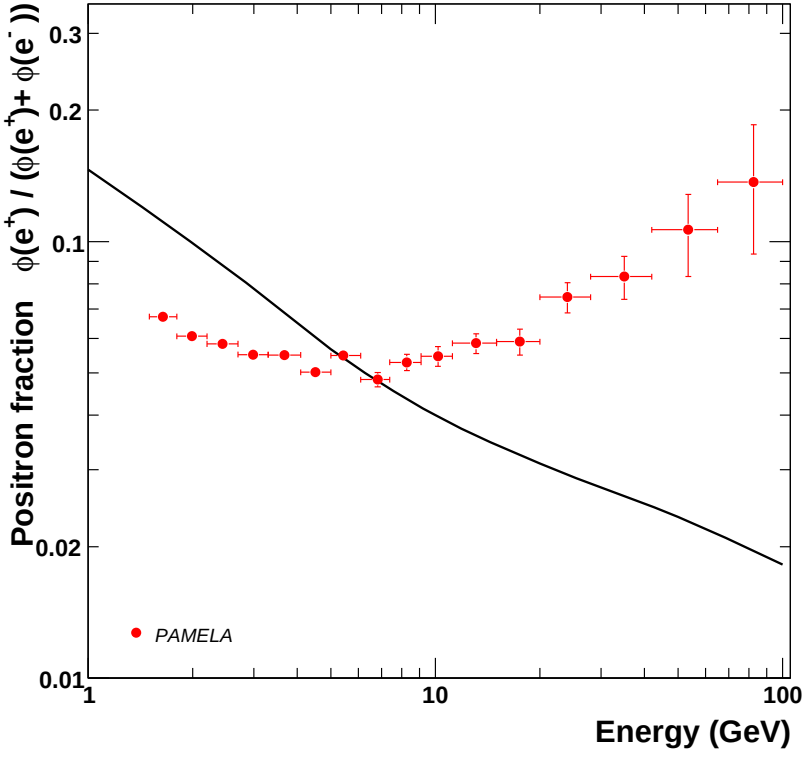
- Non–standard gravity and DM: 5

$e^{\pm}$ "Excesses"

PAMELA



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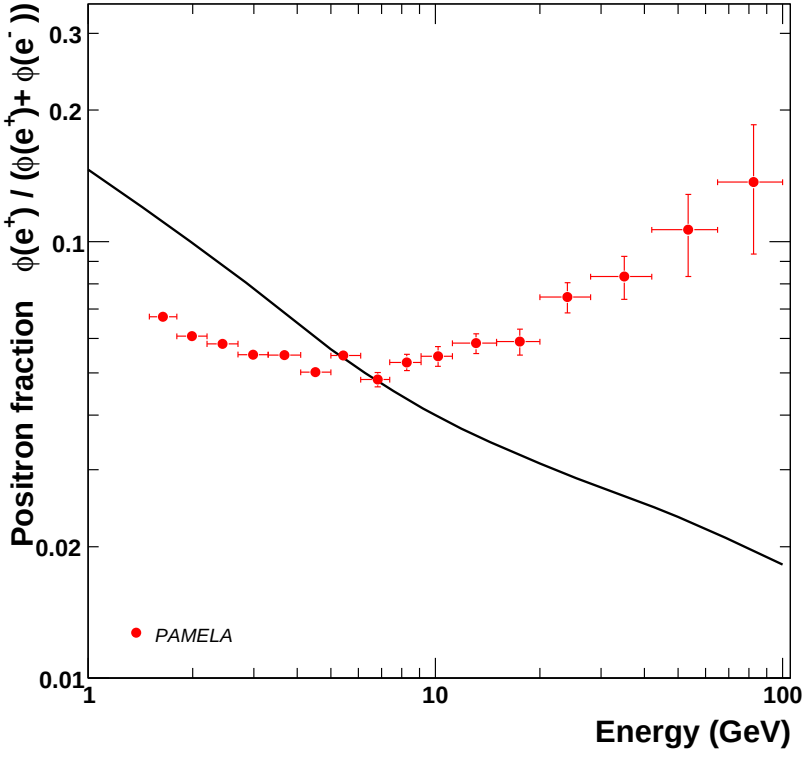
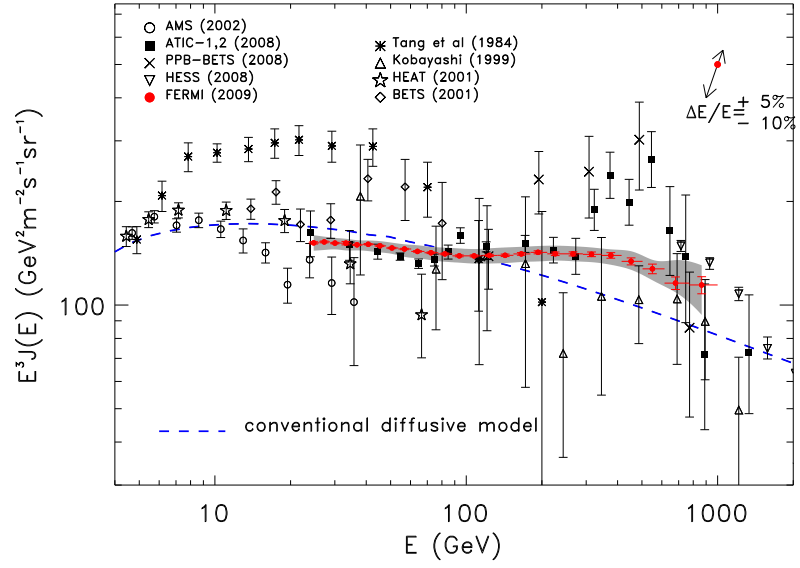


Fermi/LAT



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Examples:

Kohri, Mazumdar, Sahu, Stephens: arXiv:0907.0622;

Fairbairn, Zupan: arXiv:0810.4147;

Kohri, McDonald, Sahu: arXiv:0905.1312

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Other constraints on PAMELA explanation

- γ's: From direct emission in annihilation or decay; from $\tau \to \pi^0 \to \gamma$ decays; from "inverse Compton" scattering ($e^{\pm} + \gamma_{\rm bckg} \to \gamma_{\rm high\ E} + e^{\pm}$). Bertone, Cirelli, Strumia, Taoso: arXiv:0811.3744; Kawasaki, Kohri, Nakayama: arXiv:0904.3626; Regis, Ullio: arXiv:0904.4645

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- ν bounds Hisano, Kawasaki, Kohri, Nakayama: arXiv:0812.0219

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- Pion production in nearby CR source: Mertsch, Sarkar: arXiv:0905.3152

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  - With additional input: 8% error!! Catena, Ullio: arXiv:0907.0018

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- Light axions plus neutralino, in model with anomalous $U(1)$: Coriano, Guzzi, Mariano, Morelli: arXiv:0811.3675

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- Direct detection vs. LHC: former may have bigger reach in "focus point" SUSY. Baer, Park, Tata: arXiv:0903.0555

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- Proposal for satellite to look for $X-$rays from ν_R decay: den Herder et al.: arXiv:0906.1788

Other network activities: no alternatives

TeVeS (modified theory of Newtonian gravity) cannot simultaneously explain galactic rotation curves and lensing data! Ferreras, Mavromatos, Sakellariadou, Yusaf: arXiv:0901.3932 and arXiv:0907.1463

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- Experiment may give clues soon: LHC, Xenon–100, . . .