Astrophysical boost factor and Dark Matter indirect detection

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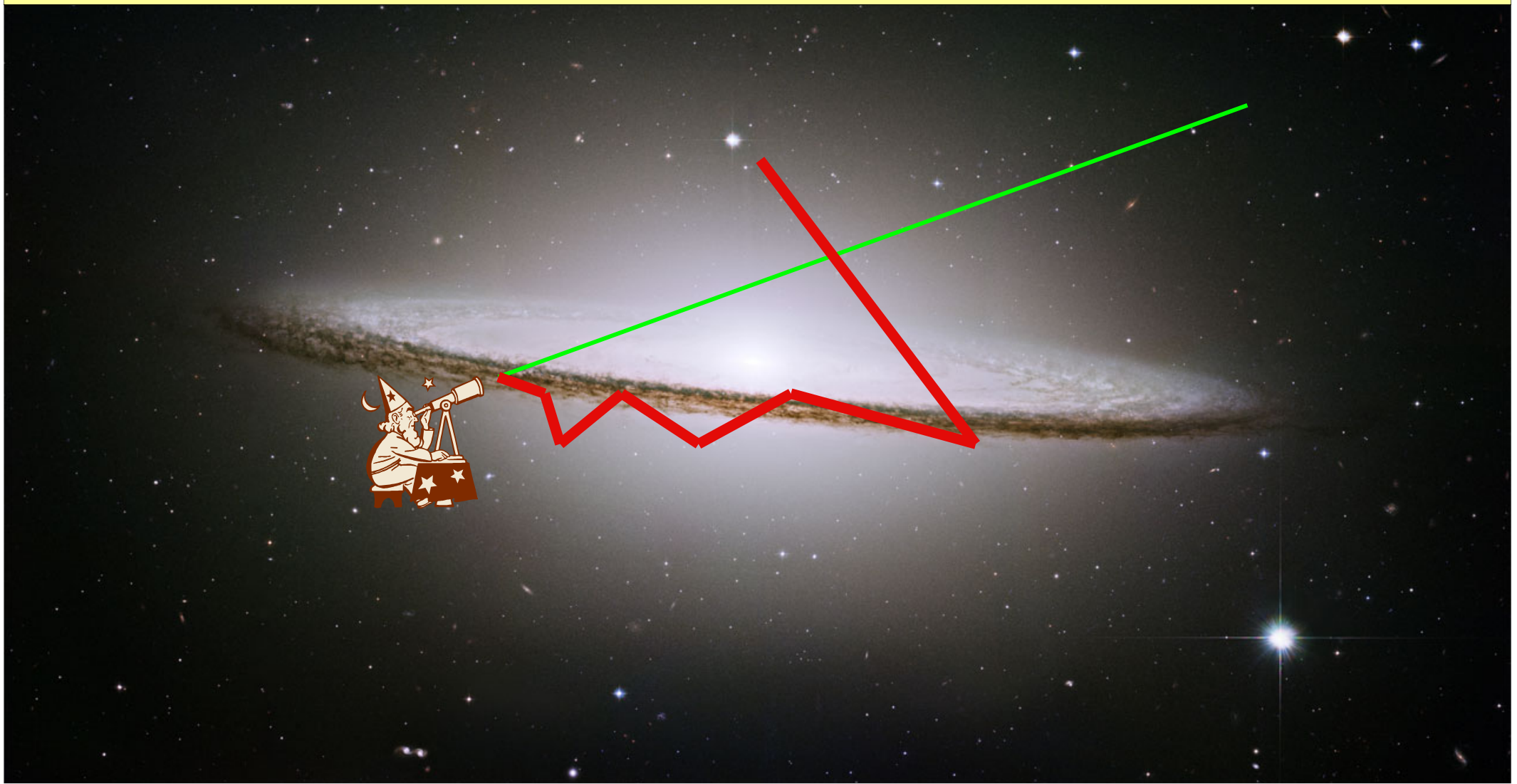
TAUP 2009

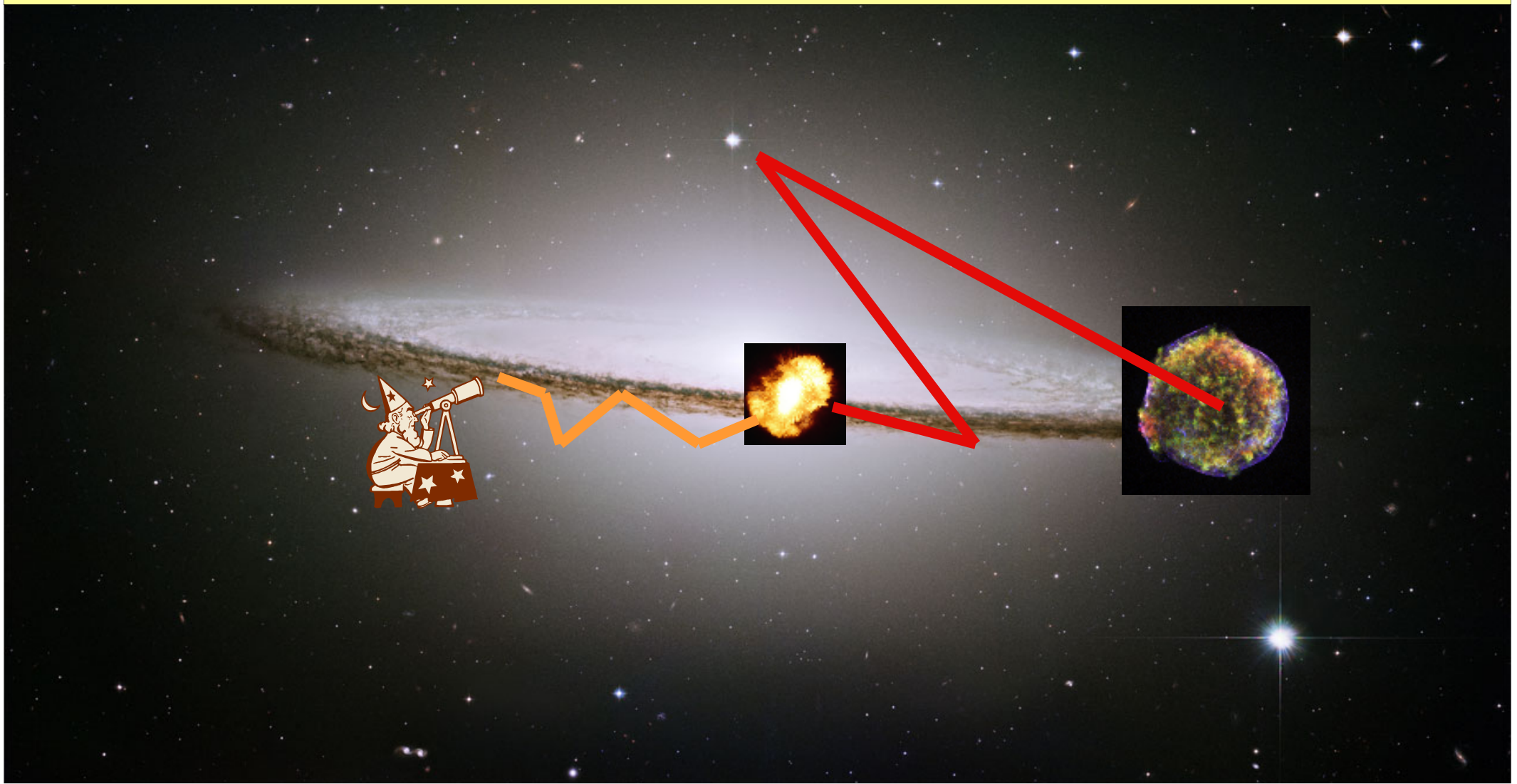
Dark Matter indirect detection

$$\chi + \chi \rightarrow q\bar{q}, W^+W^-, \ldots \rightarrow \gamma, \bar{p}, \bar{D}, e^+ \,\&\, \nu's$$

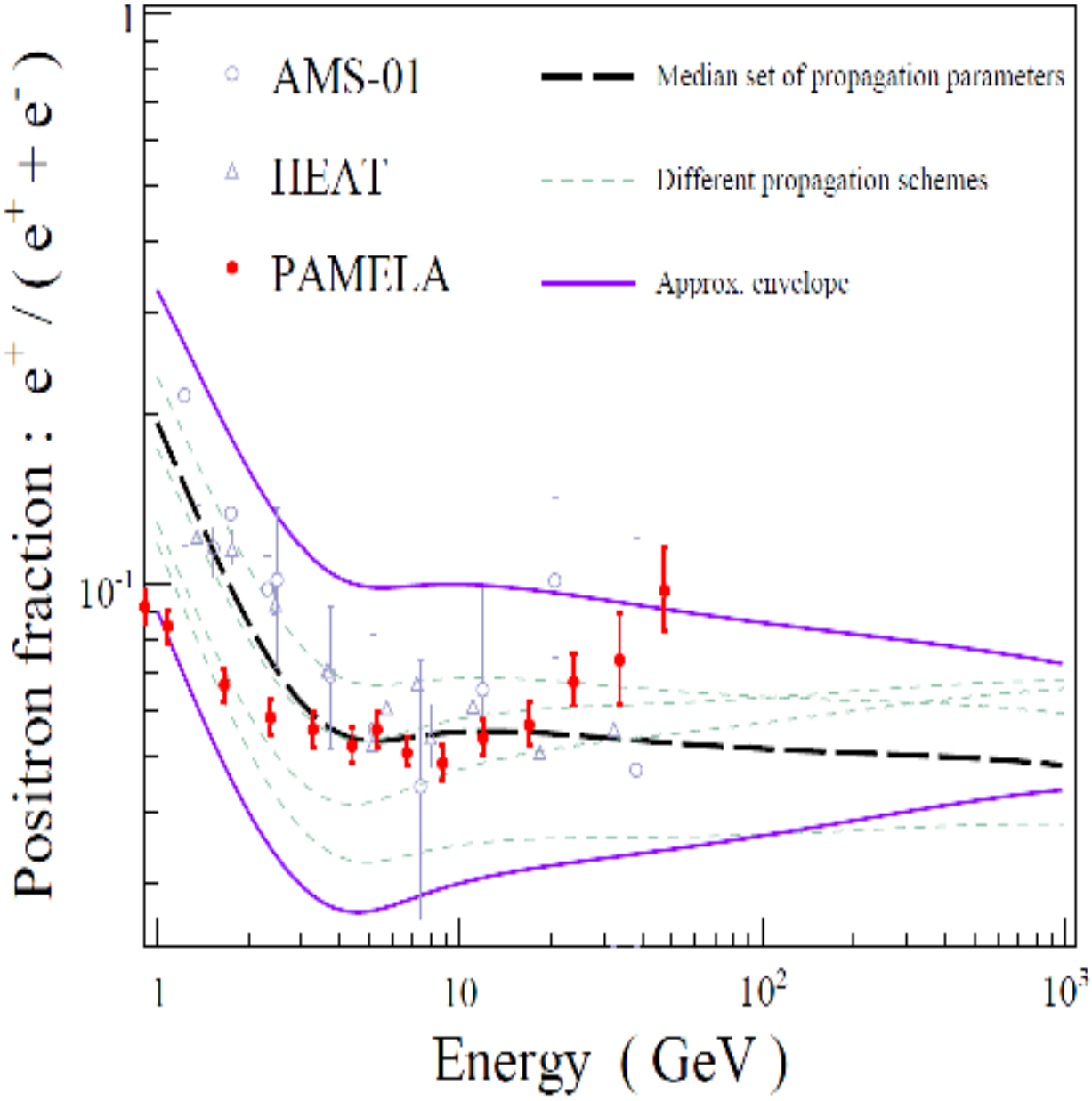


Background

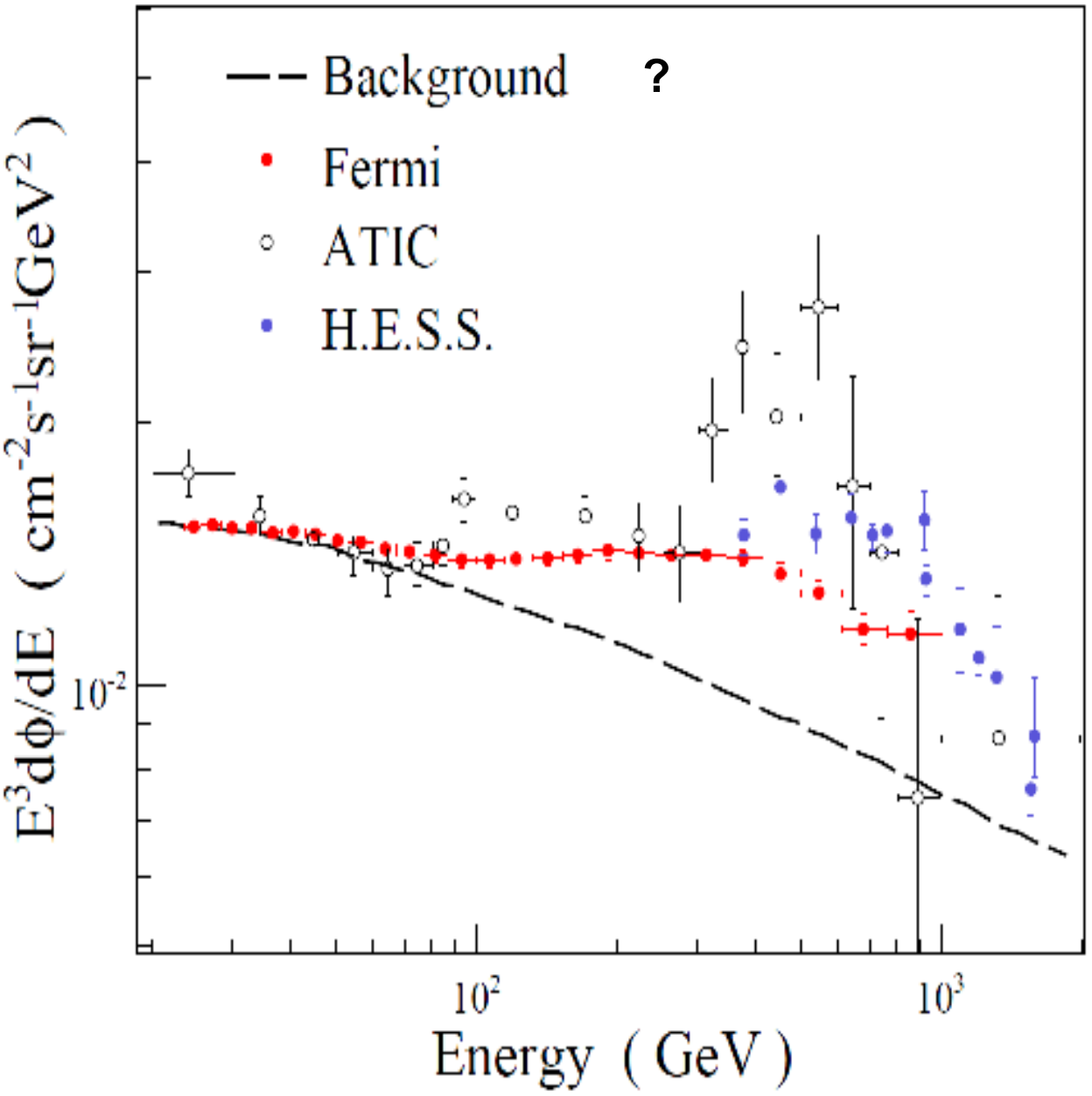
$p_{CR} + p_{ISM} \rightarrow K, \pi^0 \ldots \rightarrow \gamma, \bar{p}, \bar{D}, e^+ \,\&\, \nu's$



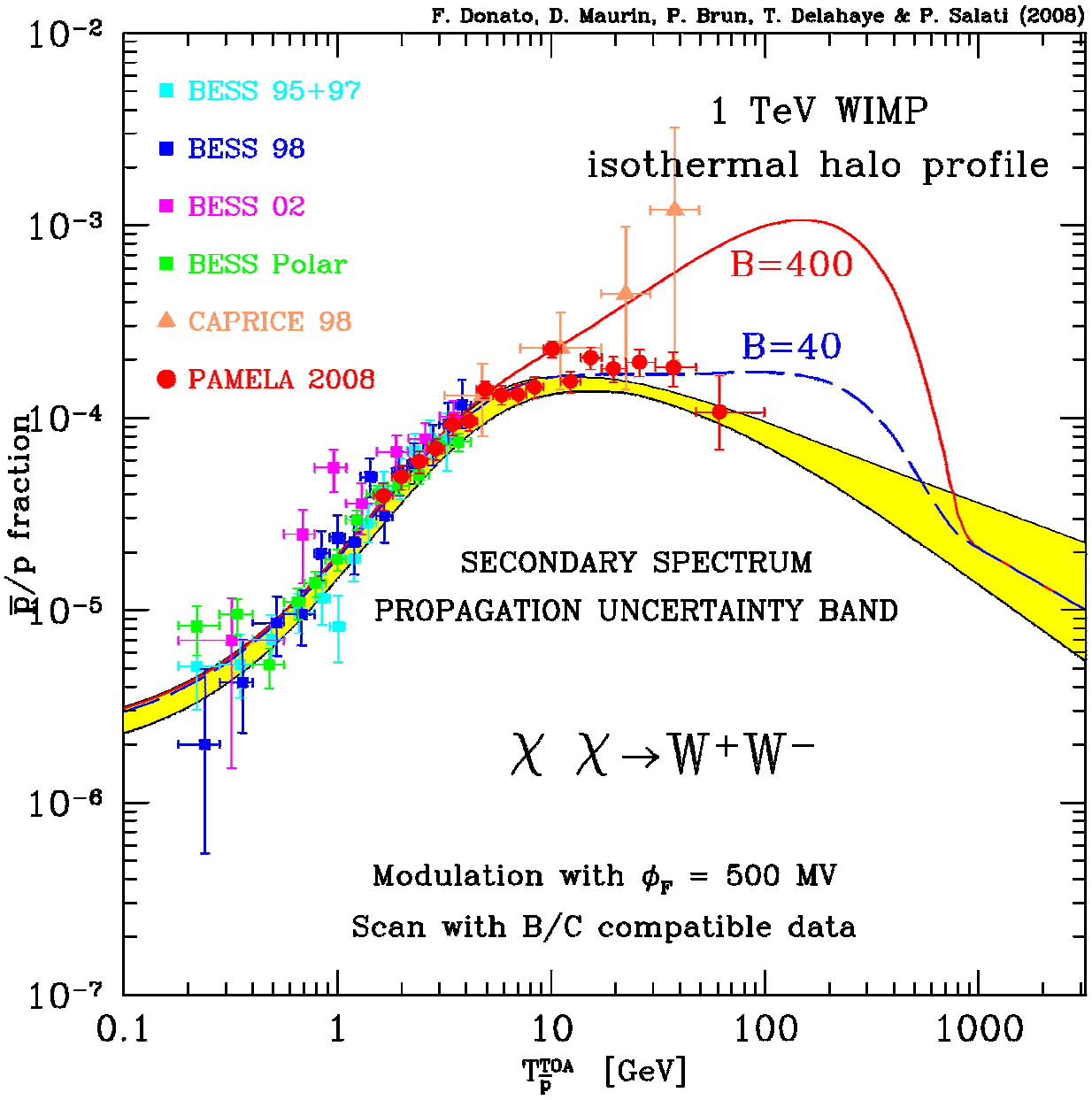
PAMELA


AMS-01
HEAT
PAMELA
Median set of propagation parameters
Different propagation schemes
Approx. envelope
Positron fraction : $e^+ / (e^+ + e^-)$
1
10^{-1}
1
10
10^2
10^3
Energy (GeV)

New data

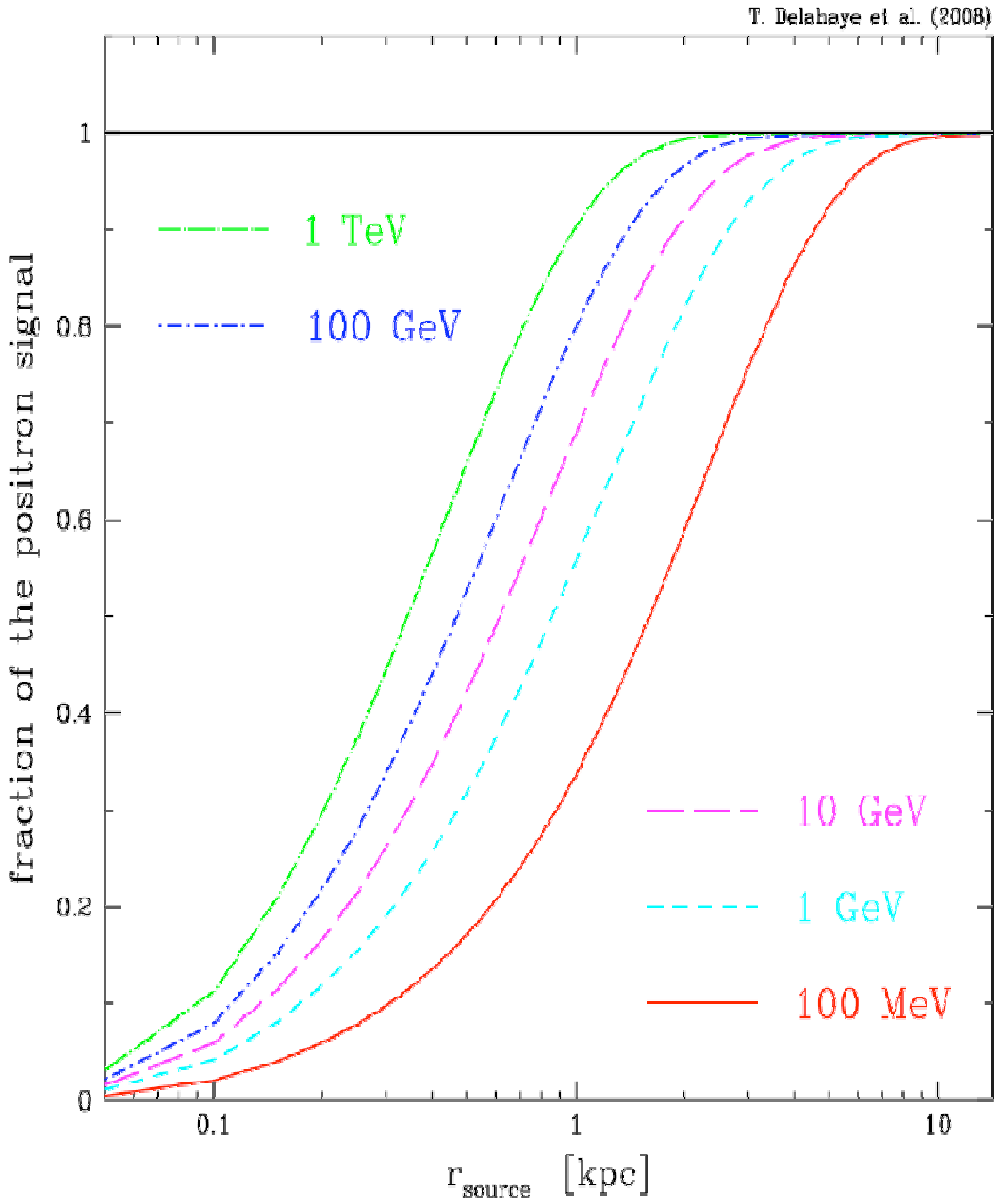

Background ?
Fermi
ATIC
H.E.S.S.
$E^3 d\phi/dE$ ($cm^{-2} s^{-1} sr^{-1} GeV^2$)
10^{-2}
10^2
10^3
Energy (GeV)

Anti-protons



PRL102
071301,2009

Origin of 2^{ndary} positrons



arXiv0809.5268

A&A (in press)

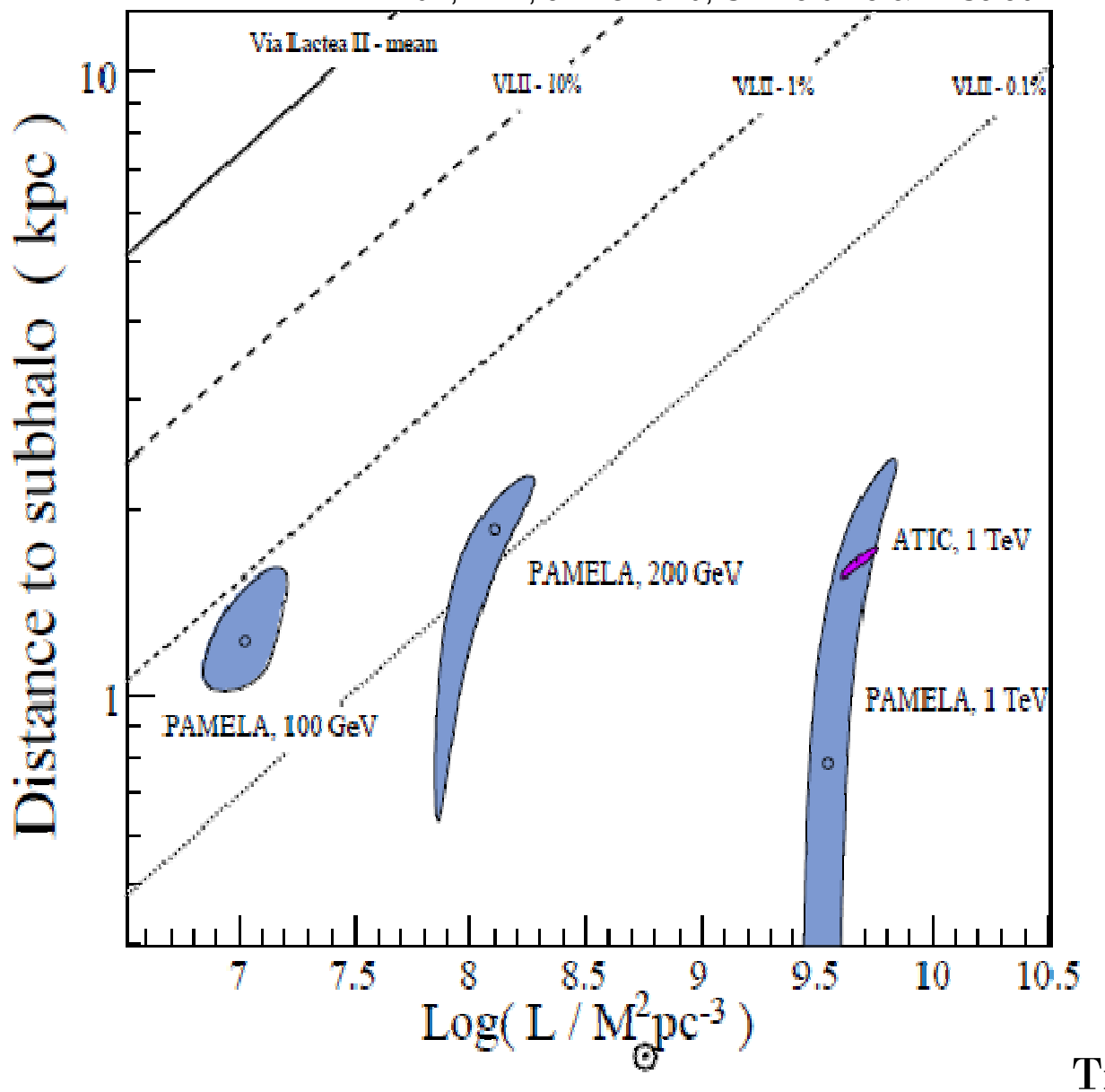
Via Lactea 2

The Graininess of Dark Matter Haloes
Zemp, Diemand, Kuhlen, Madau, Moore, Potter, Stadel, 2009, MNRAS

Clumps

$e^- \approx E^{-3.3}$

P. Brun, T.D., J. Diemand, S. Profumo & P. Salati

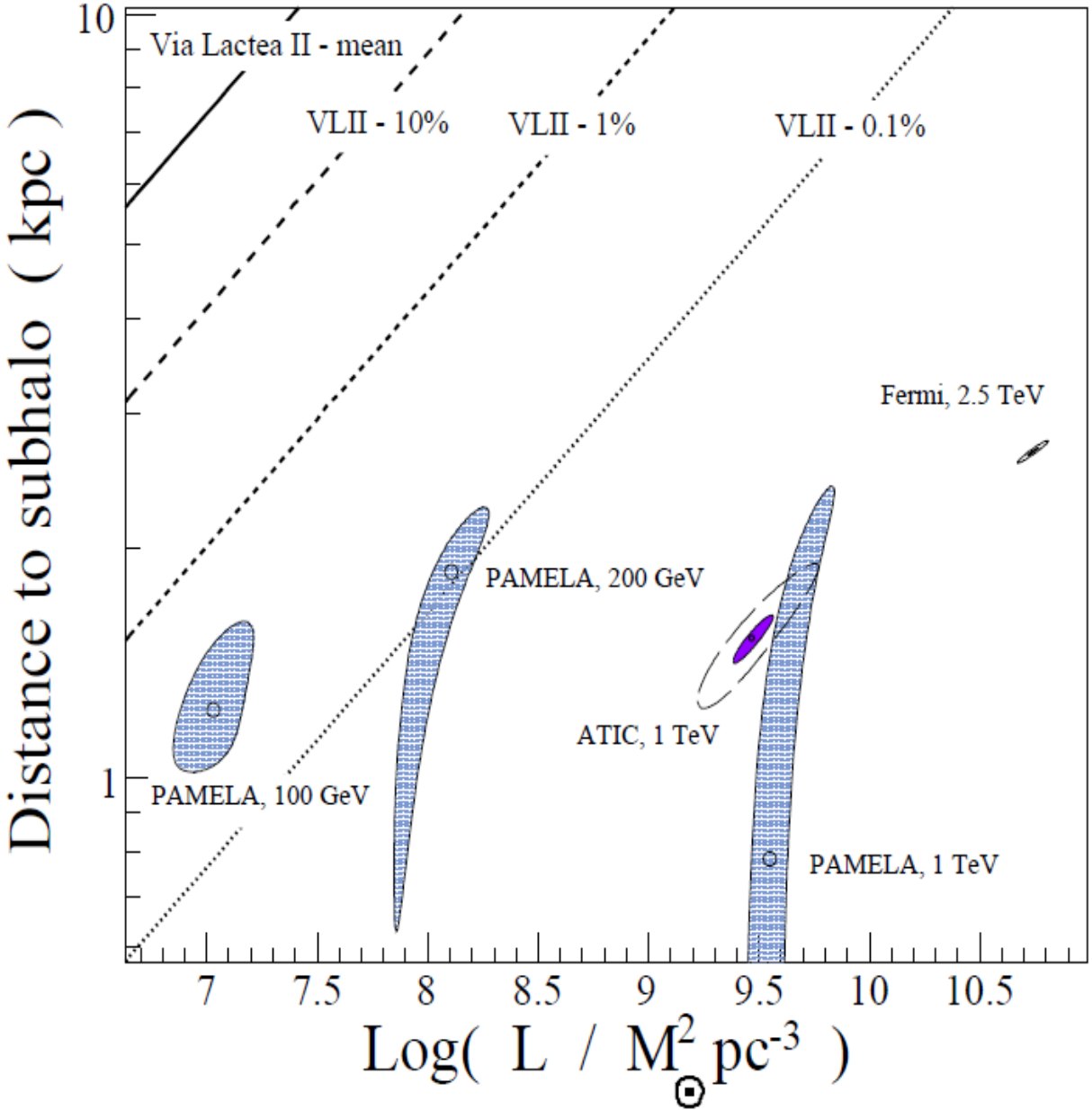


arXiv: 0904.0812

Clumps

P. Brun, T.D., J. Diemand, S. Profumo & P. Salati

$e^- \approx E^{-3.1}$



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Clumps

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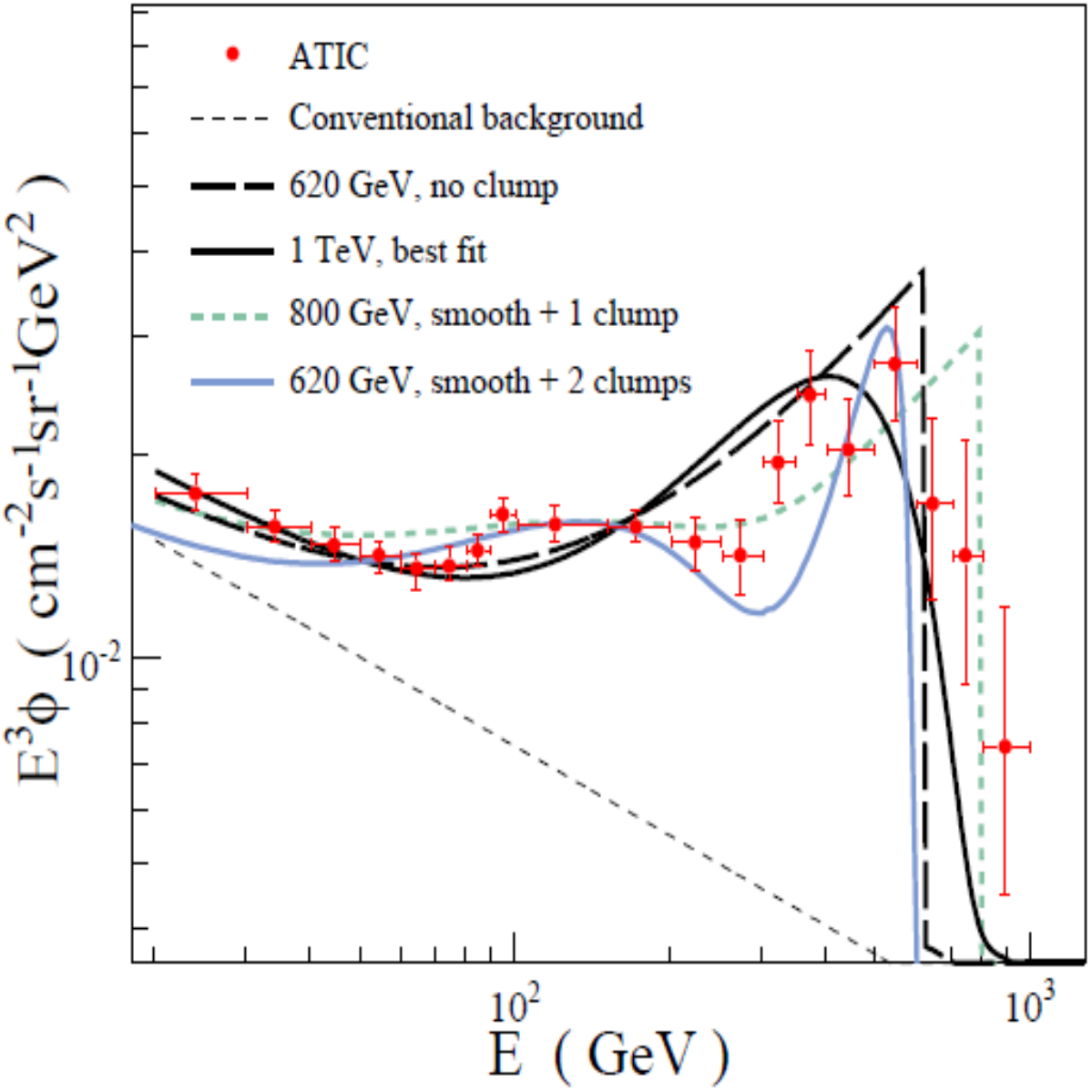

arXiv: 0904.0812

Conclusions

- One local clump could explain the e^+ data
  - But it is very very unlikely.

- Boost factor is highly energy dependent
  - Signal analysis may be more difficult than expected.