

Antiprotons in space

Pierre Fest

LAPTH, 25 NOV 2021

Around spring 2000

$$\nabla \cdot (K^j \nabla N^j - V_c N^j) - \frac{\partial}{\partial E} \left(\frac{\nabla \cdot V_c}{3} E_k \left(\frac{2m + E_k}{m + E_k} \right) N^j \right) + \frac{\partial}{\partial E} (b^j N^j) - \frac{1}{2} \frac{\partial^2}{\partial E^2} (d^j N^j) + \tilde{\Gamma}^j N^j = q^j + \sum_{m_k > m_j} \tilde{\Gamma}^{kj} N^k$$

Bon, il faut comprendre. C'est bon.

On y va.

TAGADA!

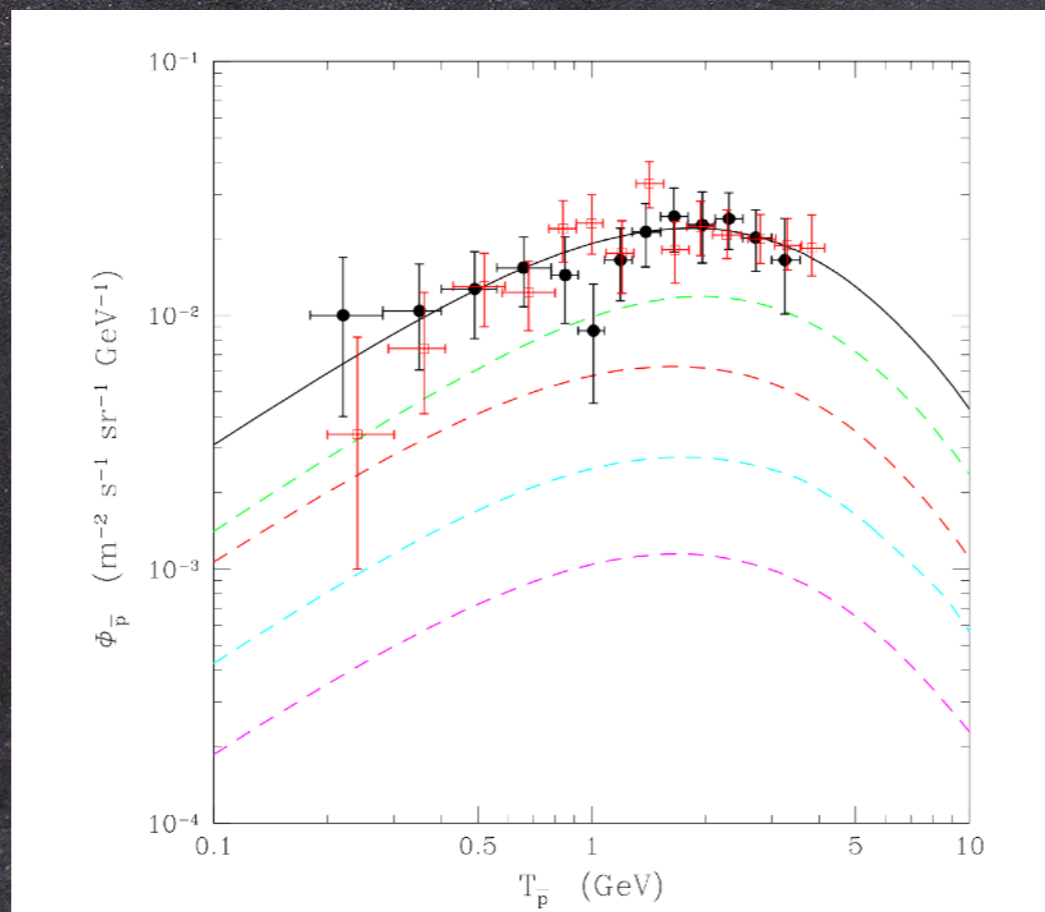
On va devenir une usine à papier!!!!

We then became kind of "usine à papier,
with you Pierre the constant presence

Secondary antiprotons

All begun with the new millenium, and the professor trusting three beginners at LAPTh...

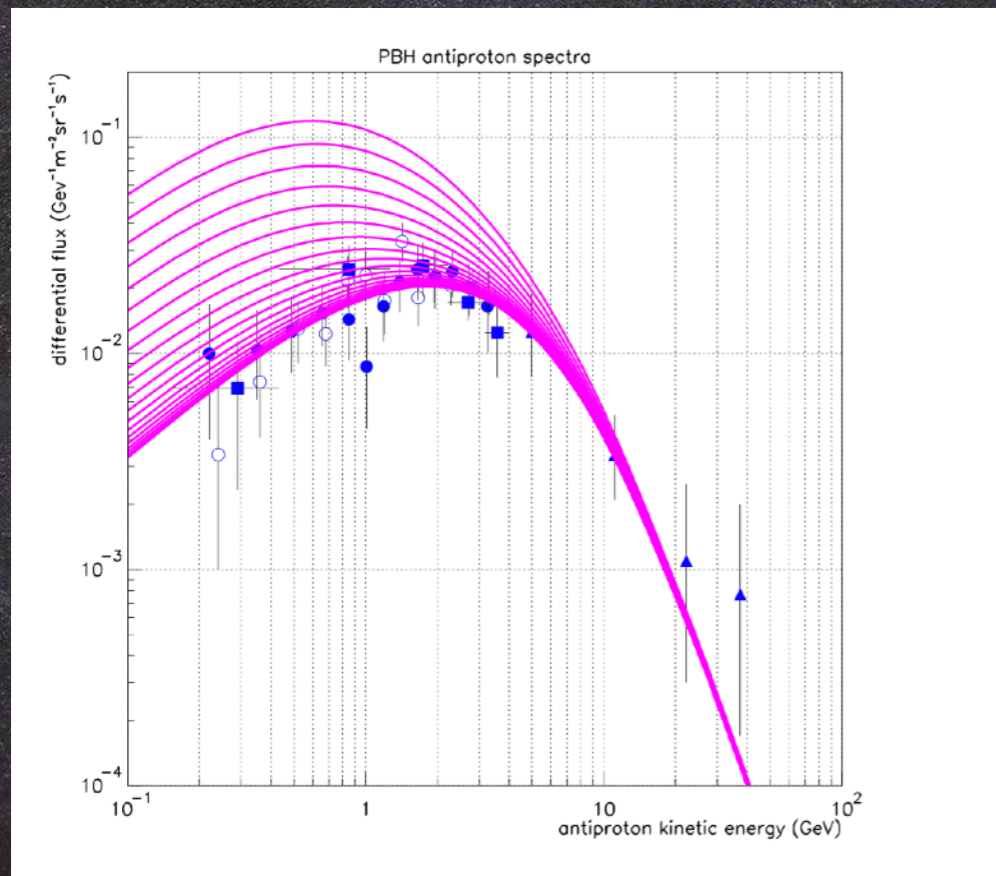
FD, D. Maurin, P. Salati, A. Barrau, G. Boudoul ApJ 2001



We were soon convinced to be the best in the world!

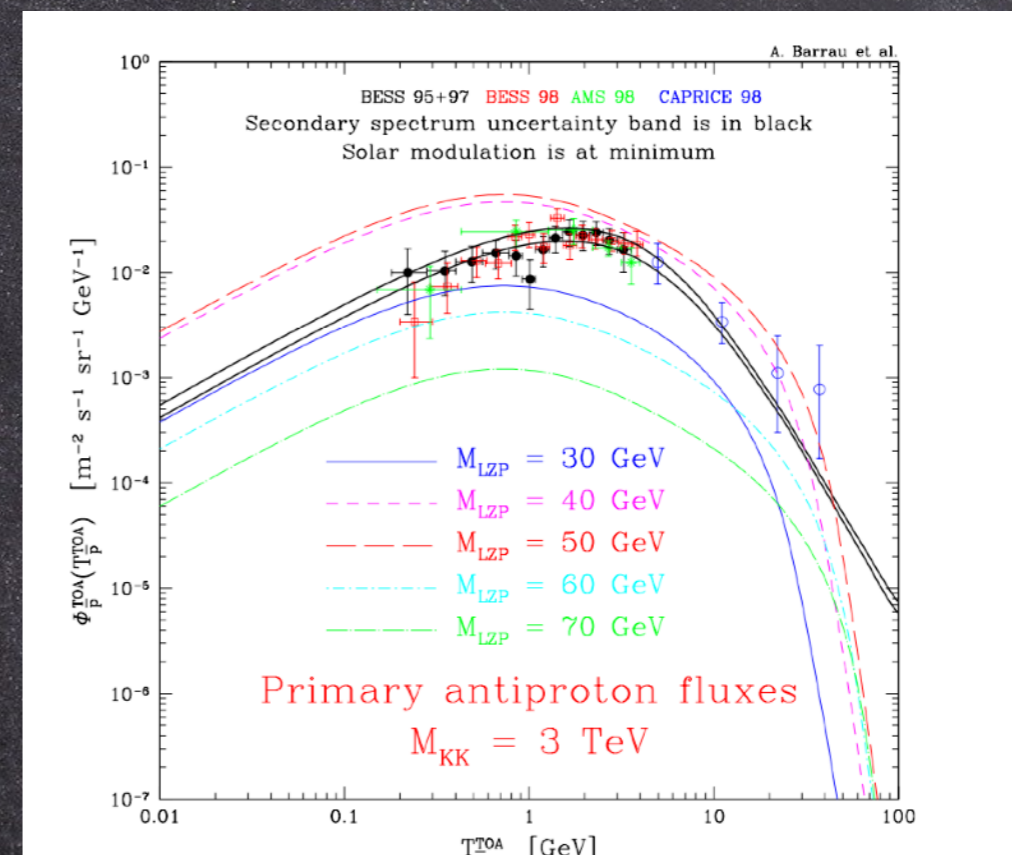
More than secondaries?

Maybe primordial black holes?



A. Barrau, G. Boudoul, F. Donato, D. Maurin, P. Salati A&A 2002

Kaluza-Klein Dark Matter



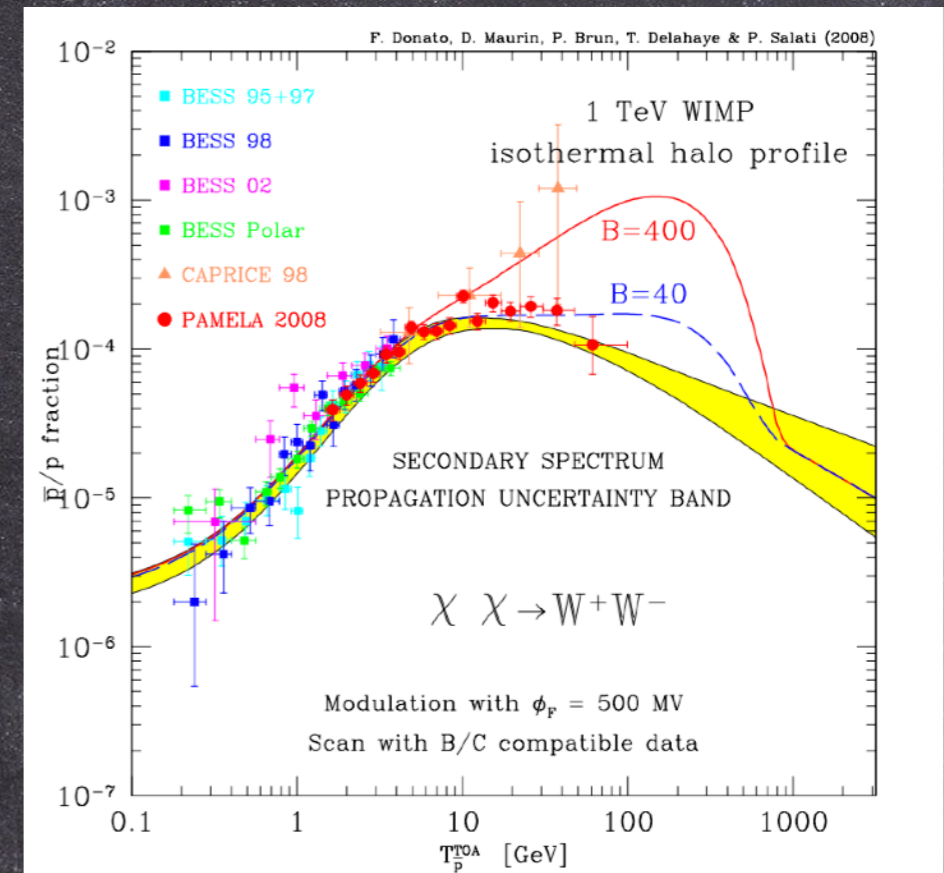
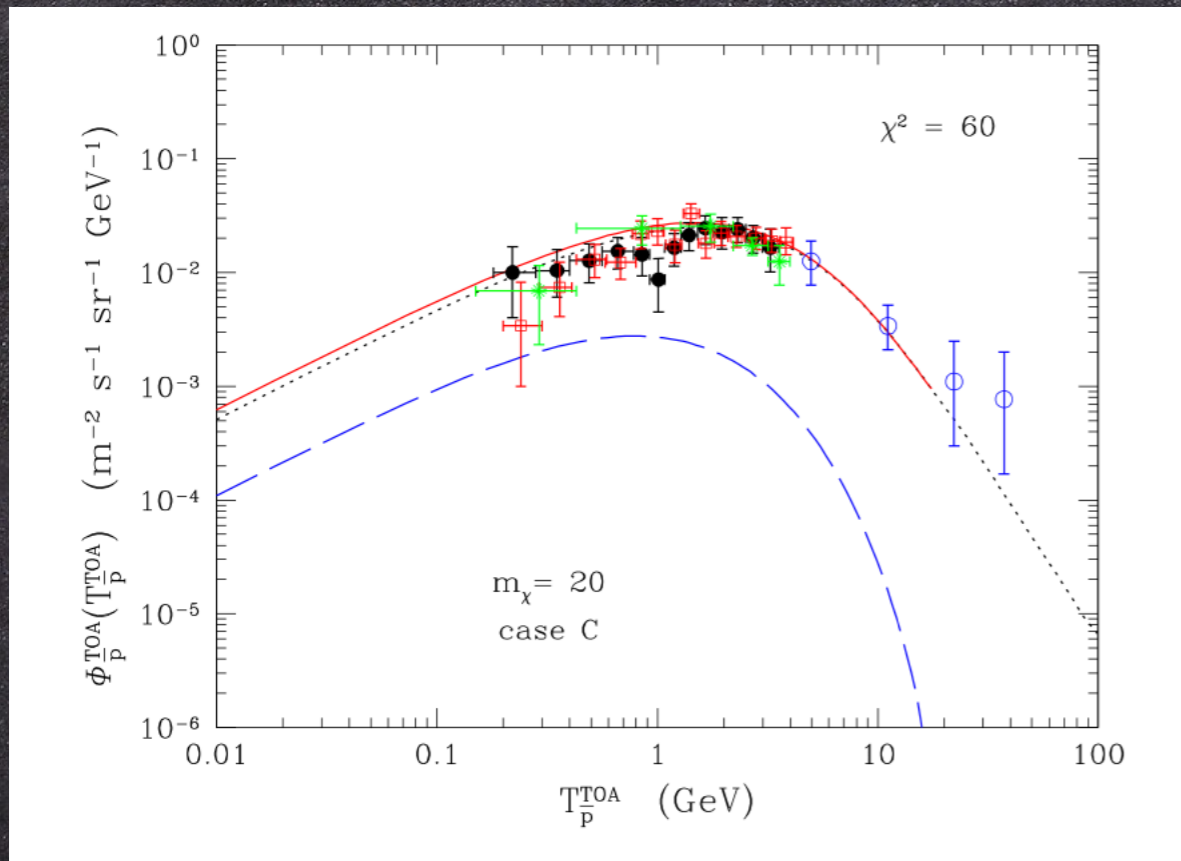
A. Barrau, P. Salati, G. Servant, F. Donato, J. Grain, D. Maurin, R. Taillet PRD 2005

Go on with Exotics

Maybe Light Dark matter?

And data from space, finally!

Unmistakable yellow!!!



A. Bottino, F. Donato, N. Fornengo, P. Salati PRD 2005

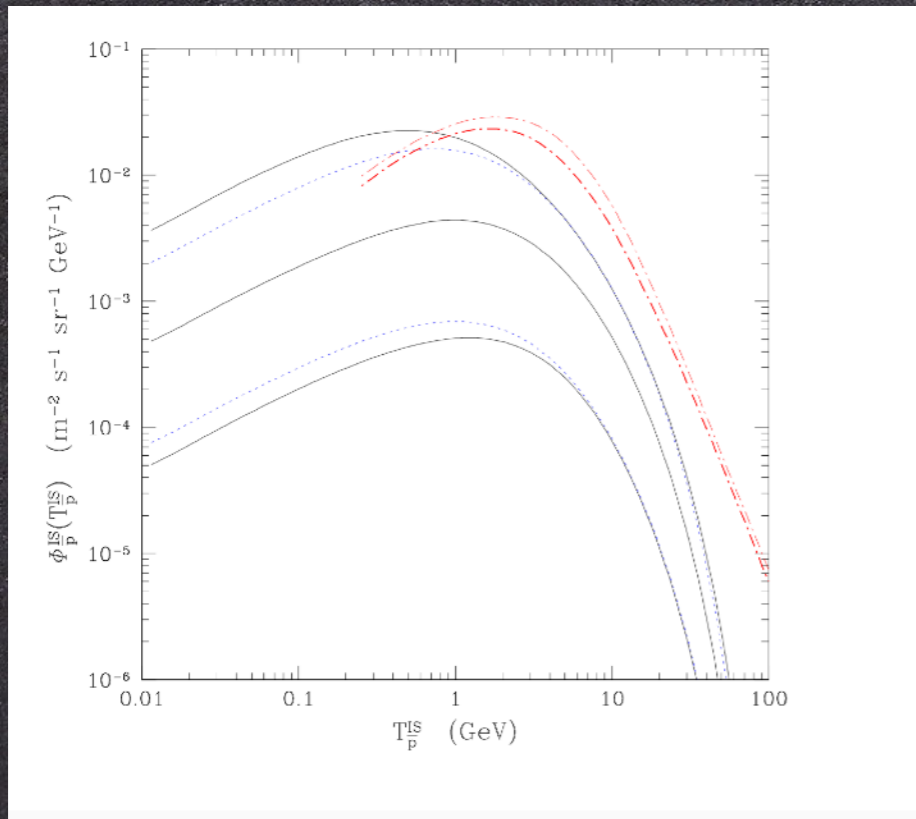
F. Donato, D. Maurin, P. Brun, T. Delahaye, P. Salati PRL 2009

T. Bringmann, P. Salati PRD 2007

P. Brun, G. Bertone, J. Lavalley, P. Salati, R. Taillet PRD 2007

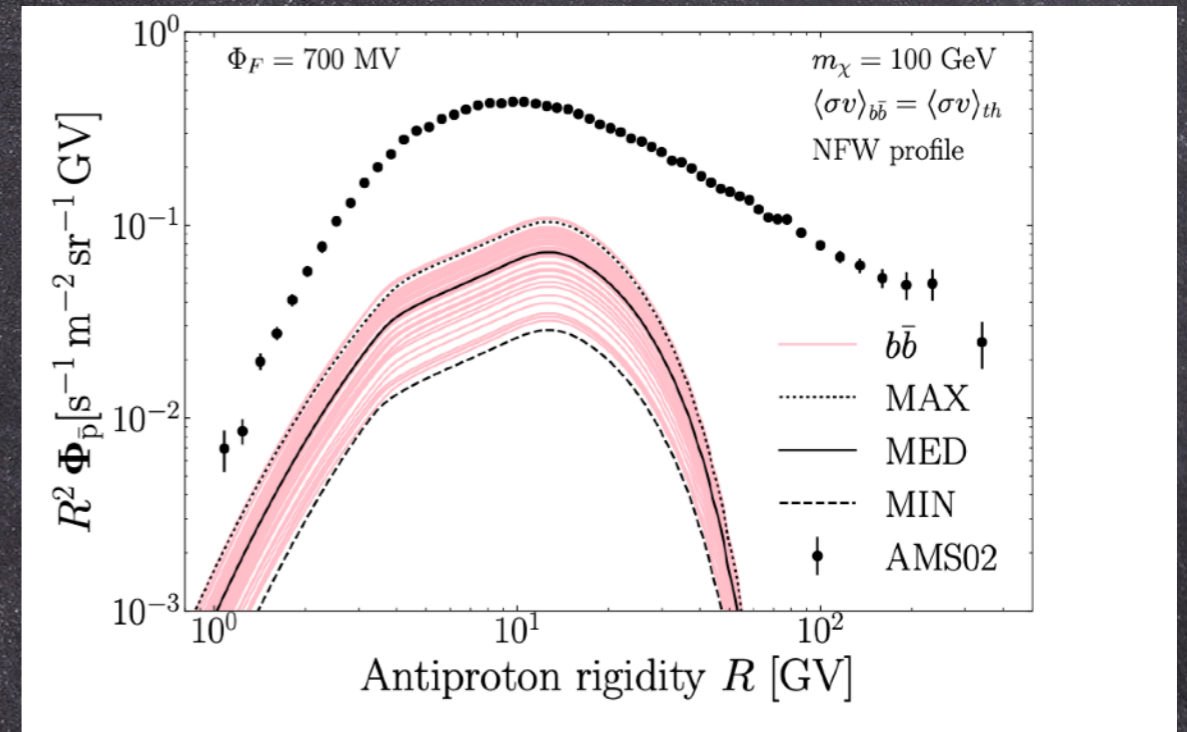
Les celebres min-med-max

The Long Lasting



F. Donato, N. Fornengo, D. Maurin, P. Salati PRD 2004

Collection Spring Summer 2021



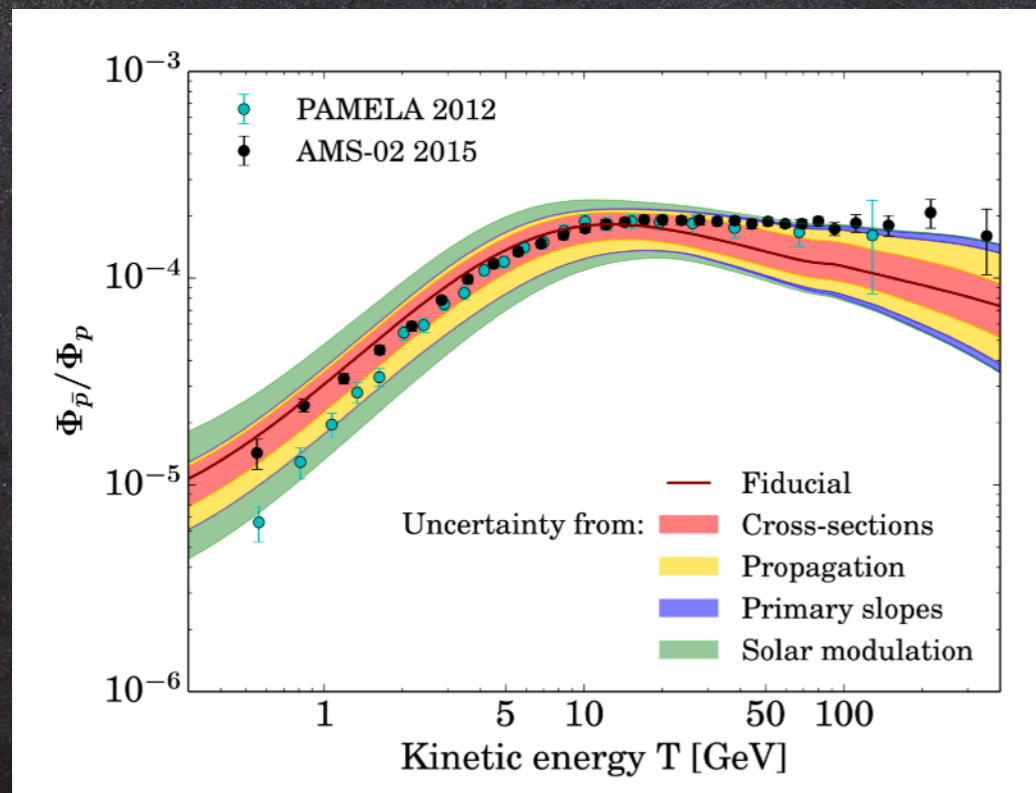
Y. Genolini, M. Boudeaud, M. Cirelli, L. Derome,
J. Lavalley, D. Maurin, P. salati, N. Weinrich PRD 2021

The final word is by Pierre always

AMS-02 antiprotons, at last!

Secondary astrophysical component and immediate implications for Dark Matter

One should be clear at some point



The group of collaborators always increasing, Pierre aggregates

Pierre, cosmic antiprotons

have no secrets for you (yes?),

thanks to you,

to your group leadership,

With a wonderful, dynamic, larger and

larger group of brilliant, nice,

collaborators and friends