

Is dark matter supersymmetric?



Coma galaxy cluster (abell1656)

Fritz Zwicky 1937



NGC4921

NGC4884

NGC4874

LEDA126780

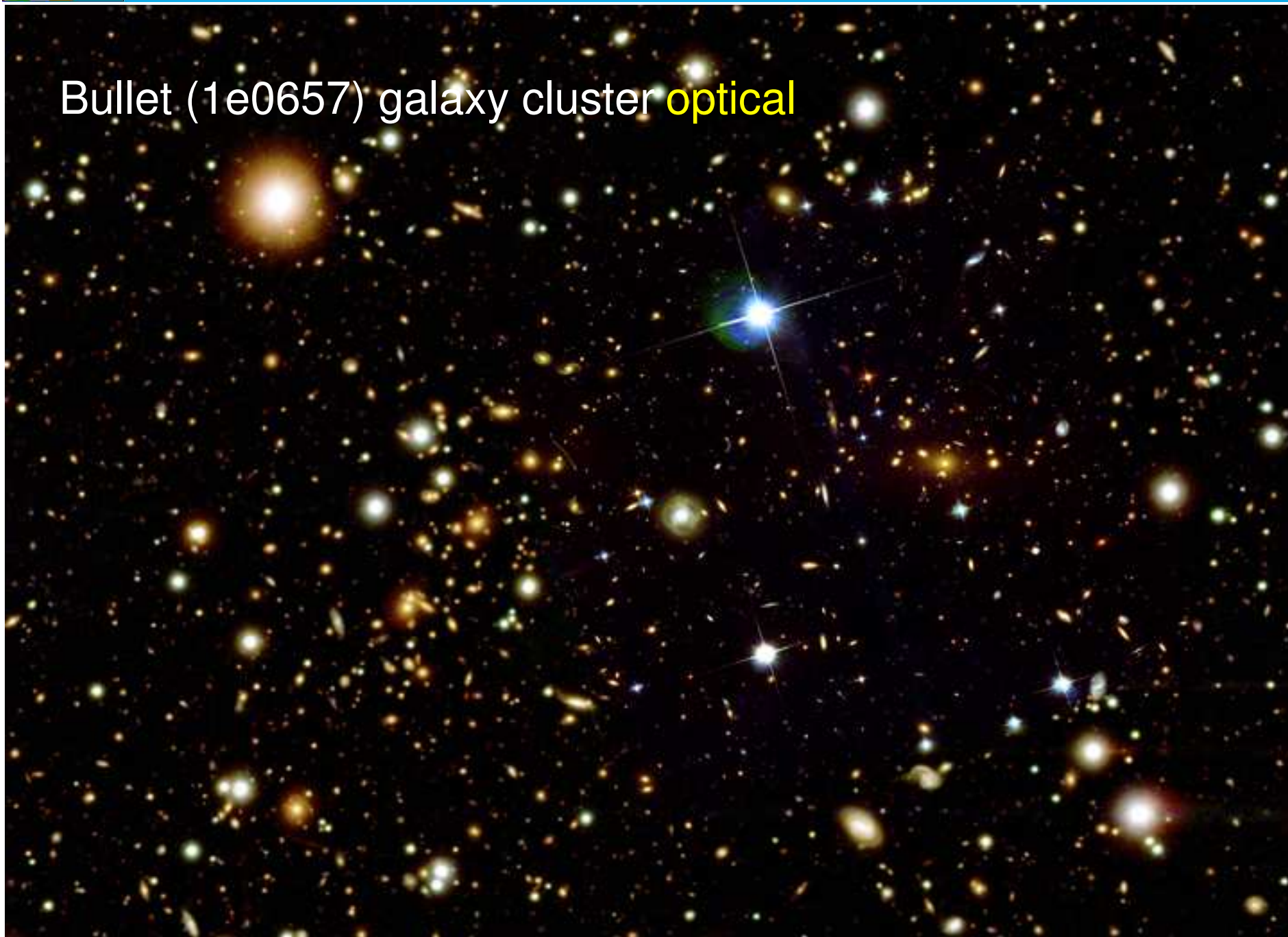
400% zoom

PGC44662
15.9mag 350 mio Ly

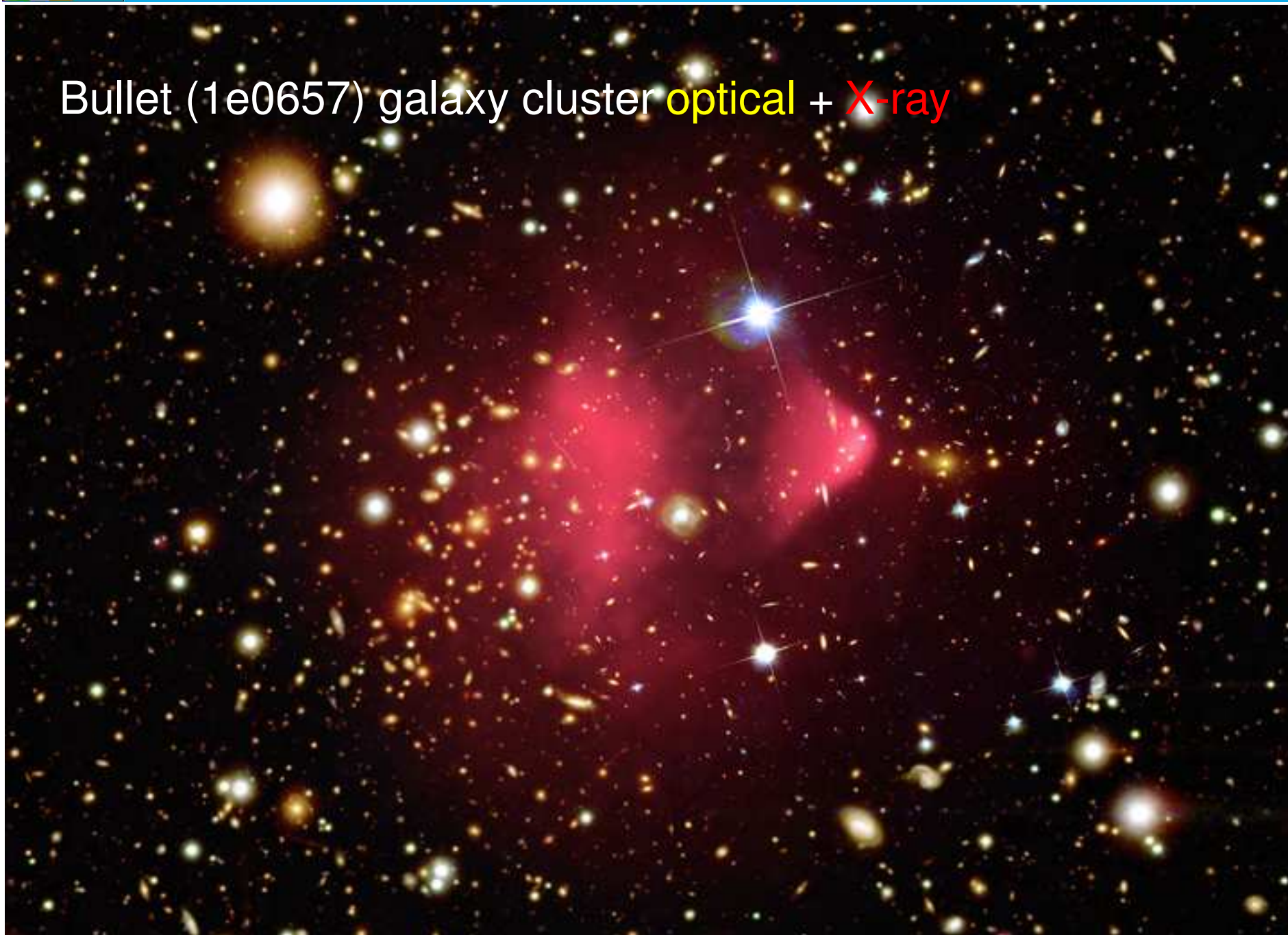
LEDA126780
19.7mag 2.1 billion Ly

PGC44676
17.4mag 340 million Ly

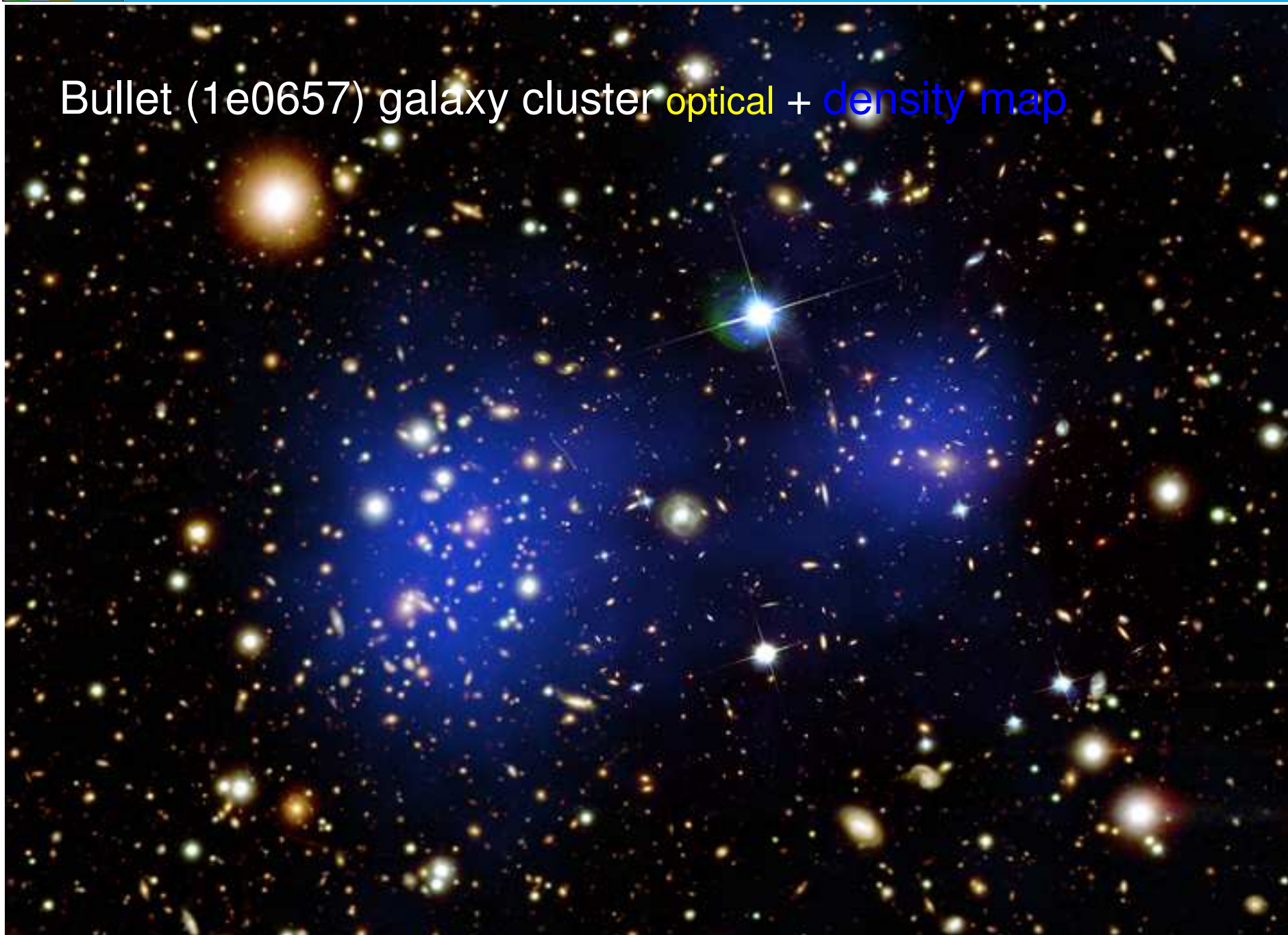
Bullet (1e0657) galaxy cluster **optical**



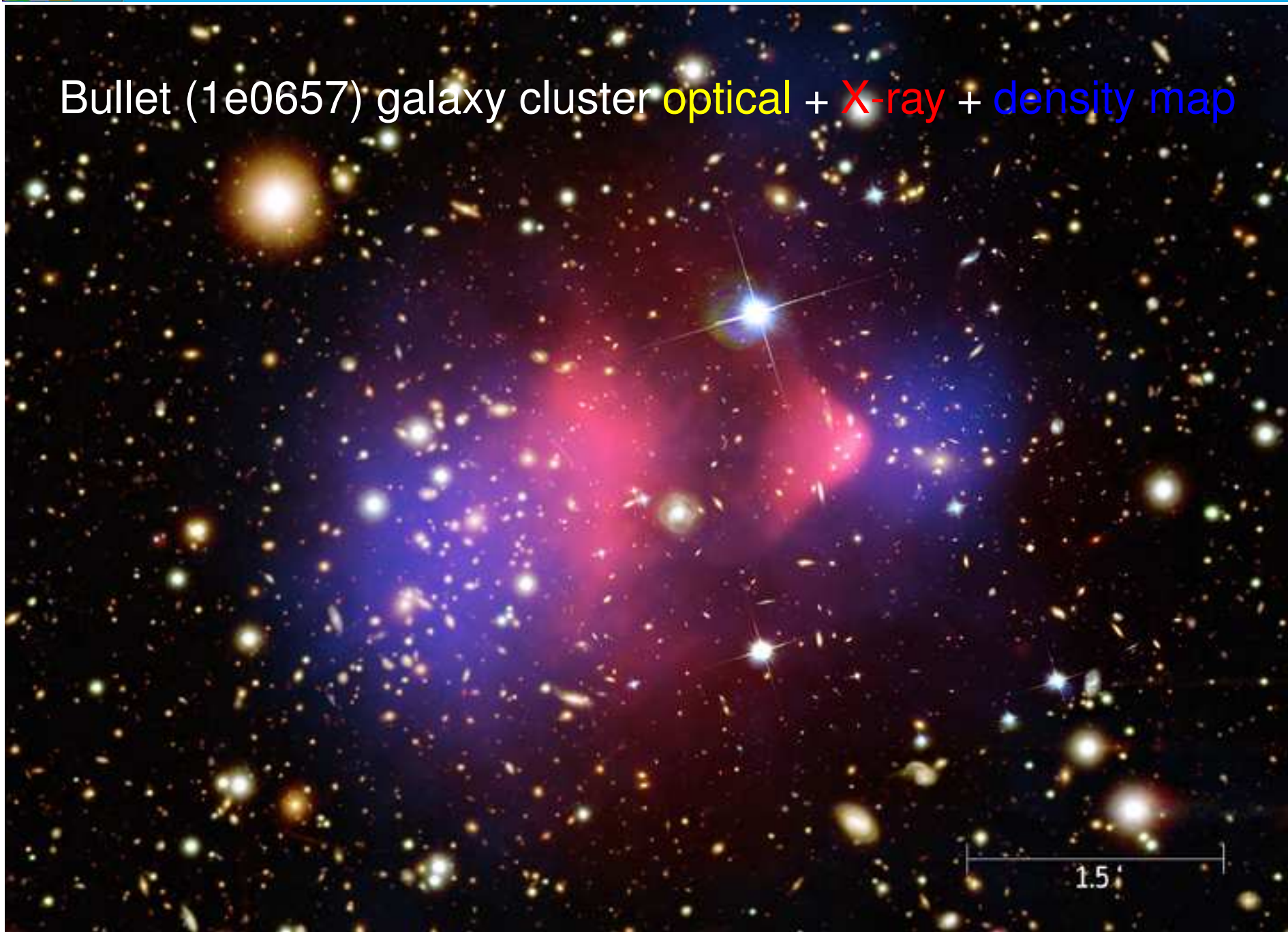
Bullet (1e0657) galaxy cluster **optical** + **X-ray**



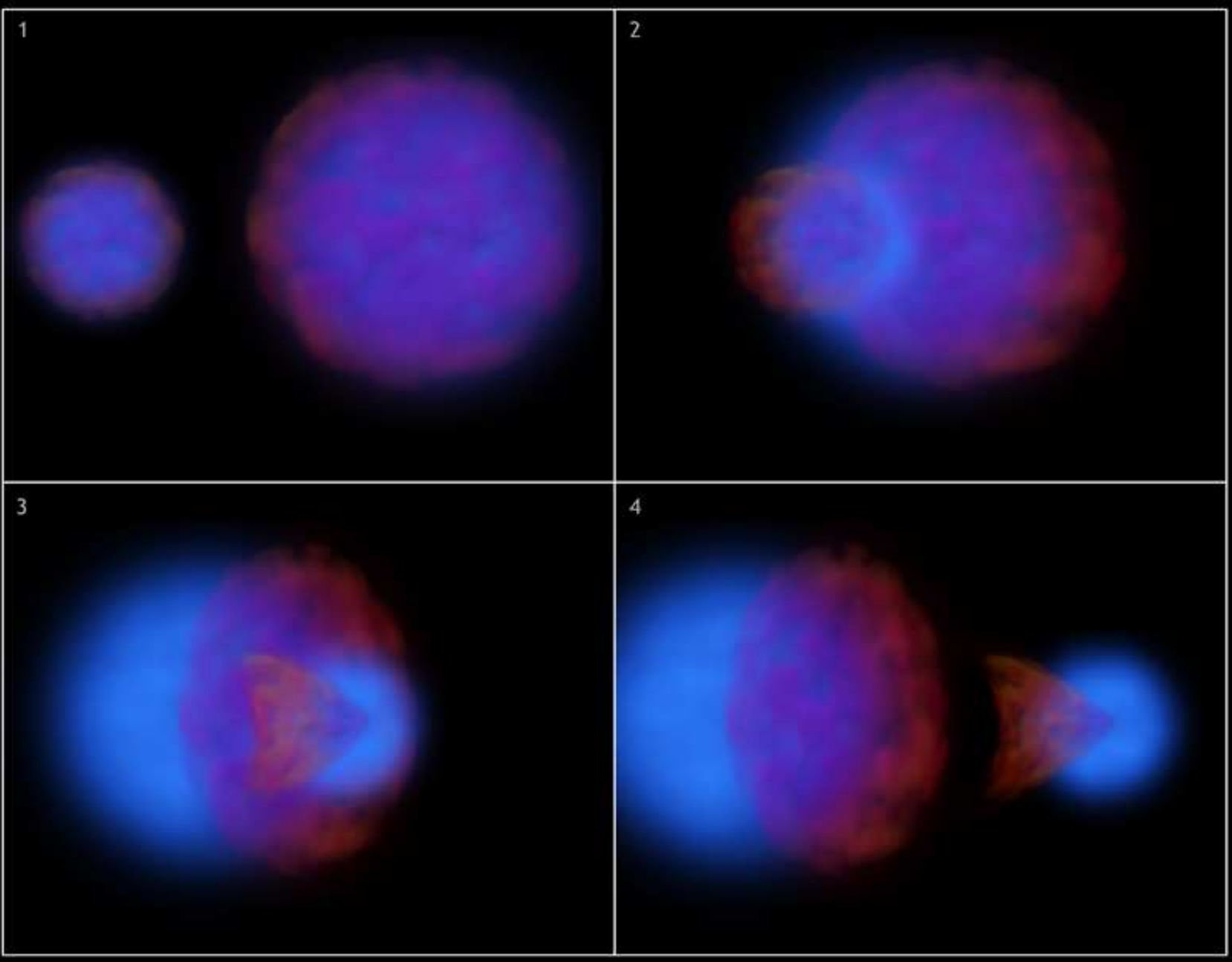
Bullet (1e0657) galaxy cluster **optical** + **density map**



Bullet (1e0657) galaxy cluster **optical** + **X-ray** + **density map**

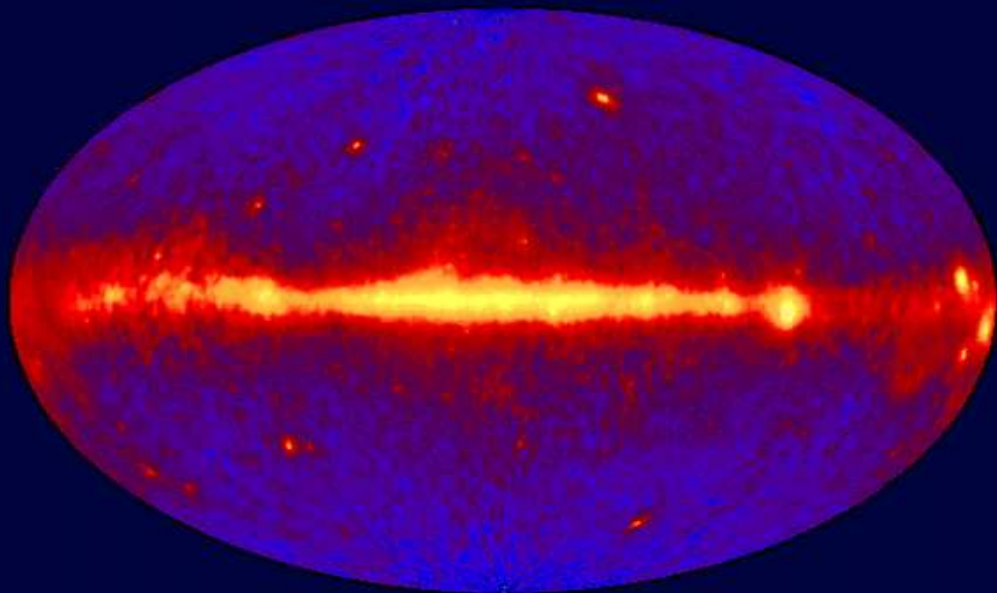


Direct evidence of the dark matter

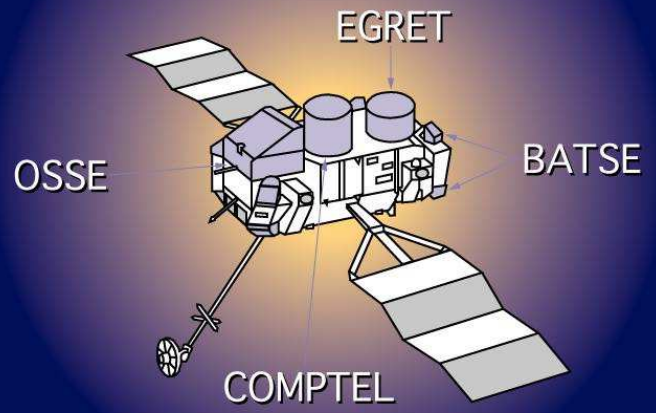


Energetic Gamma Ray Experiment Telescope

EGRET All-Sky Map Above 100 MeV



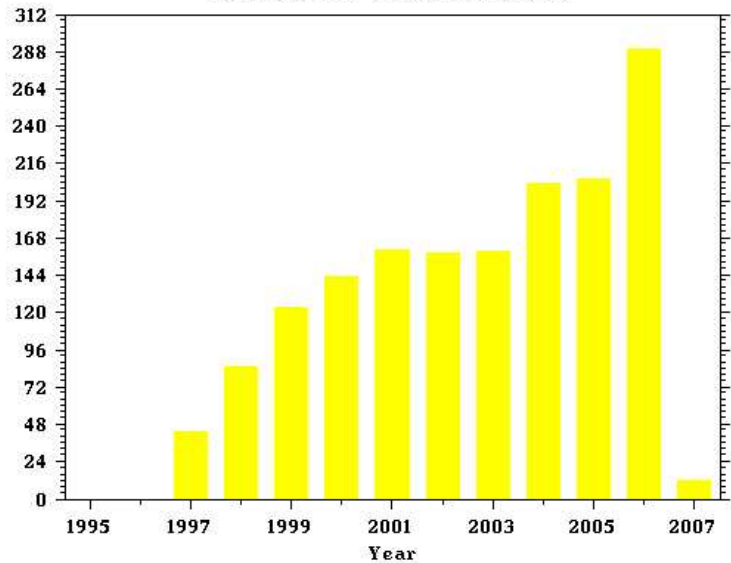
Compton Gamma Ray Observatory



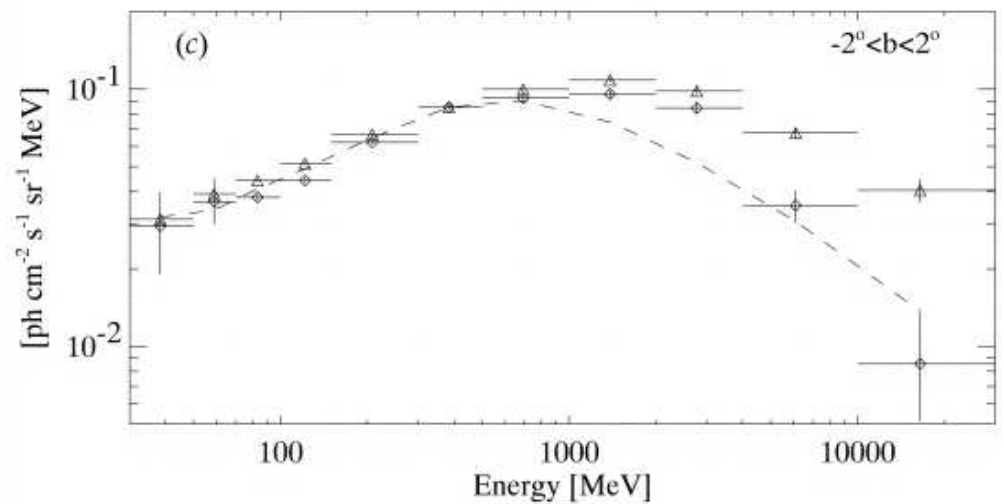
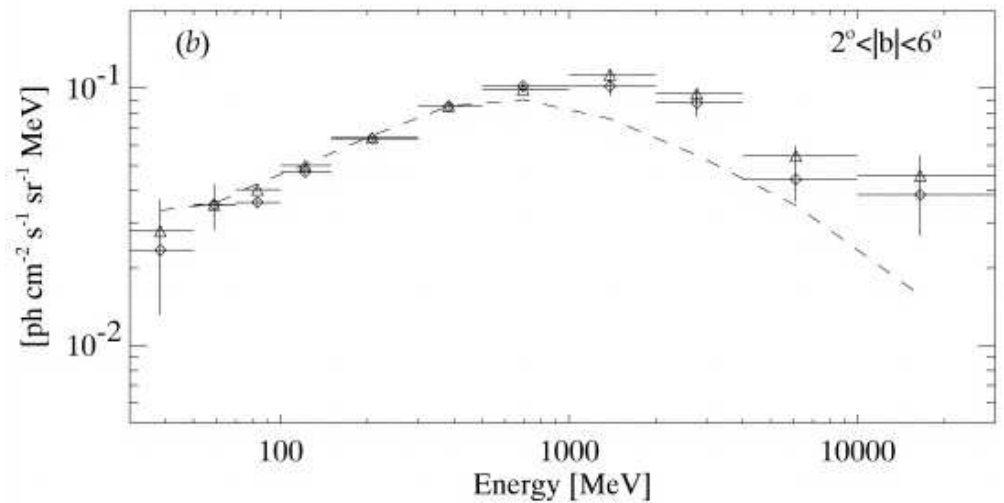
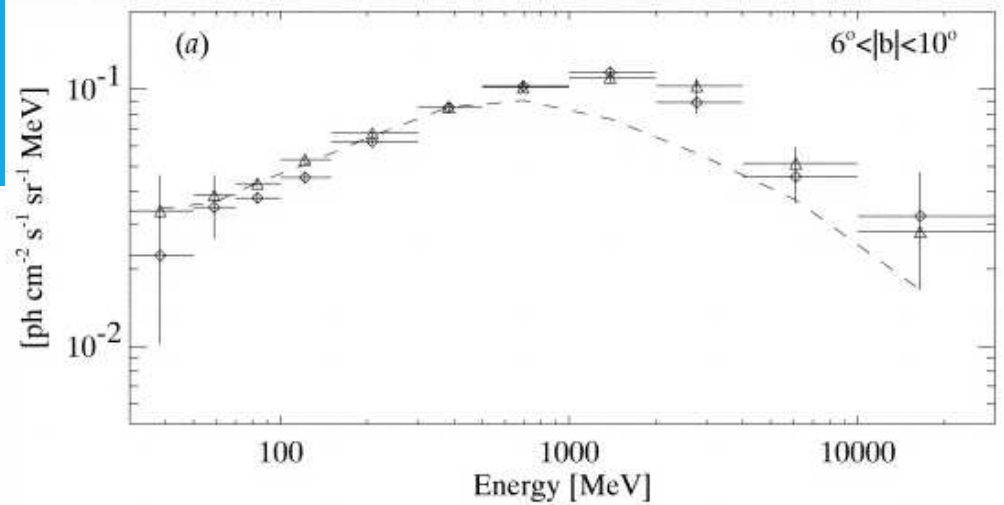
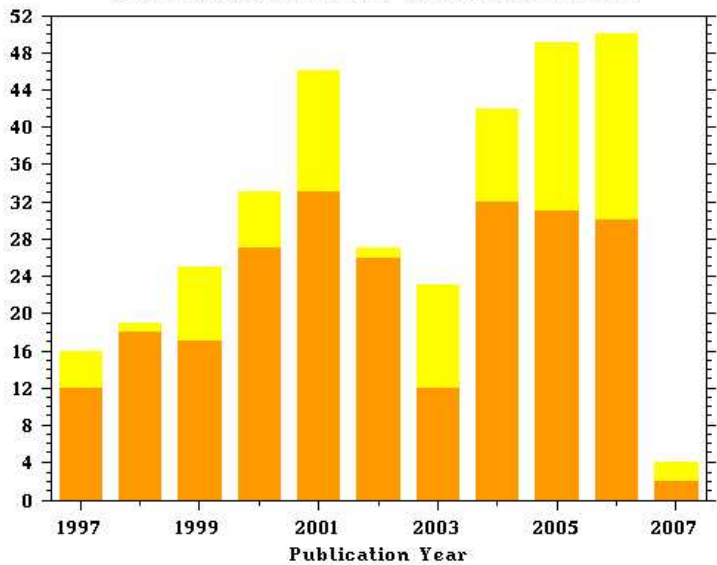


EGRET excess

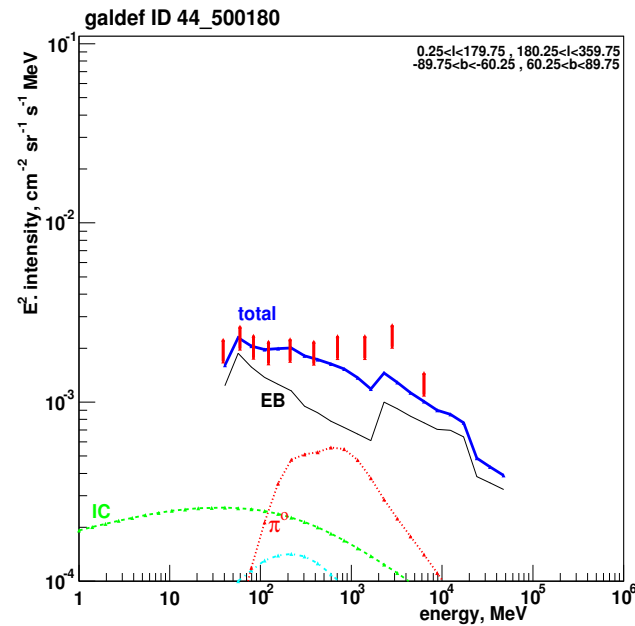
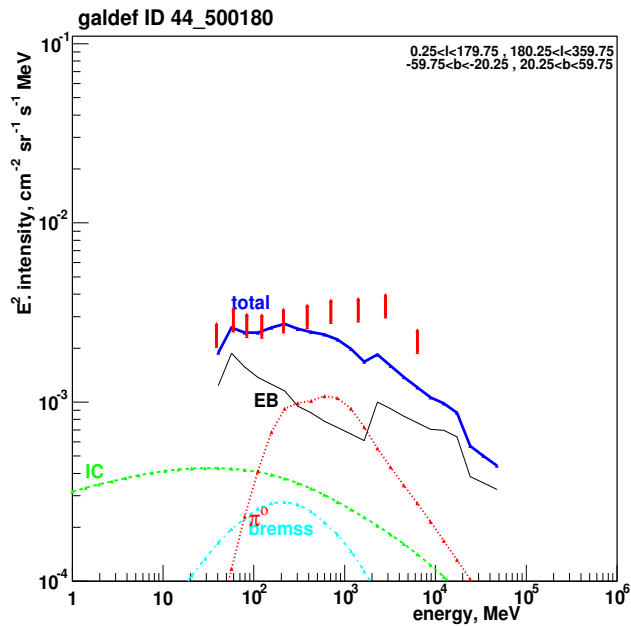
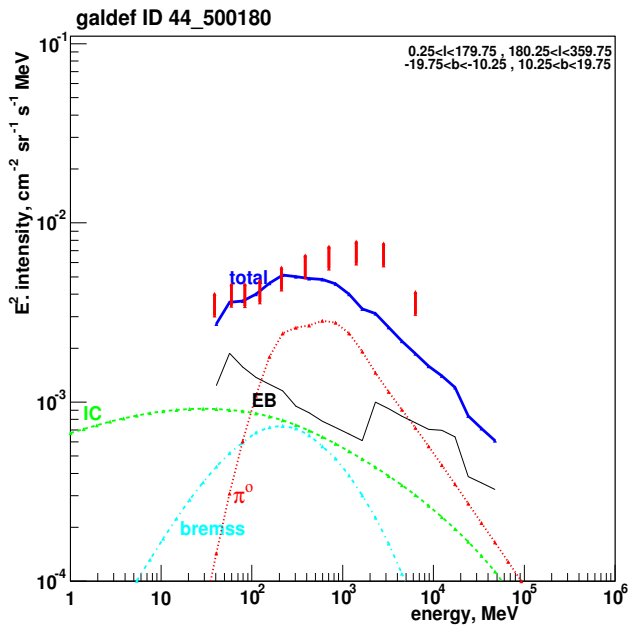
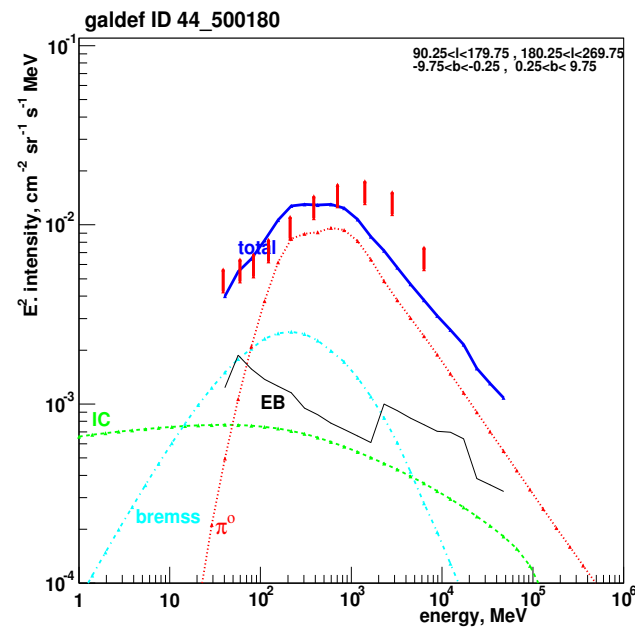
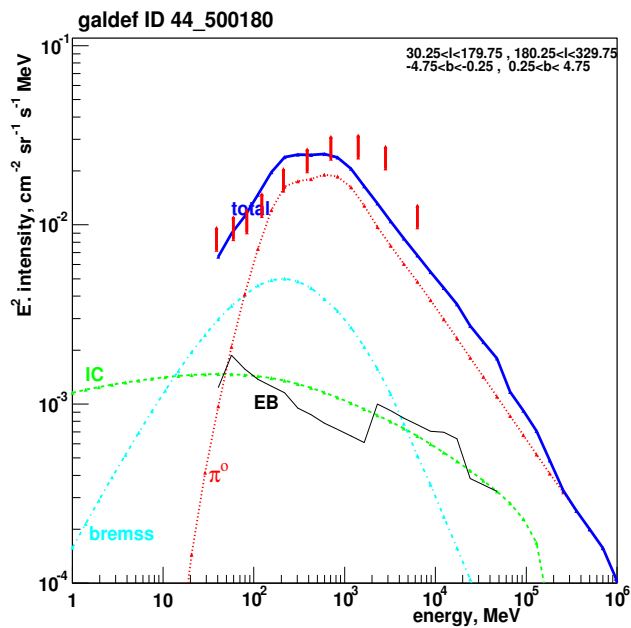
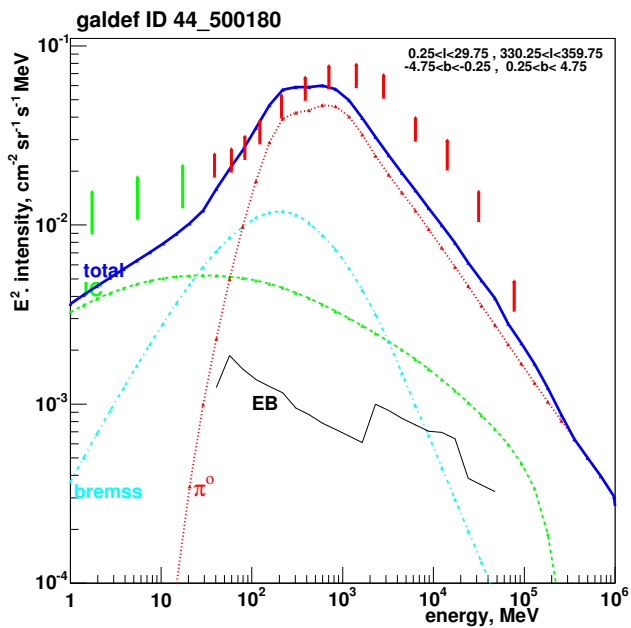
Reads/Year of 1997ApJ...481..205H

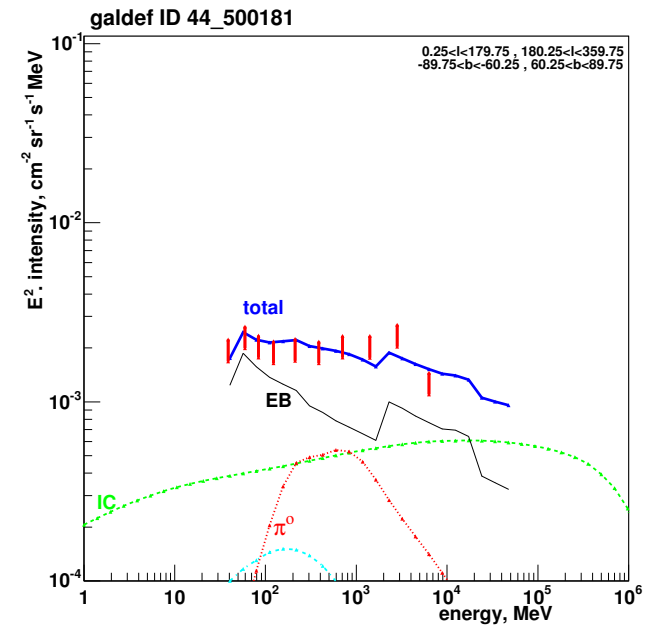
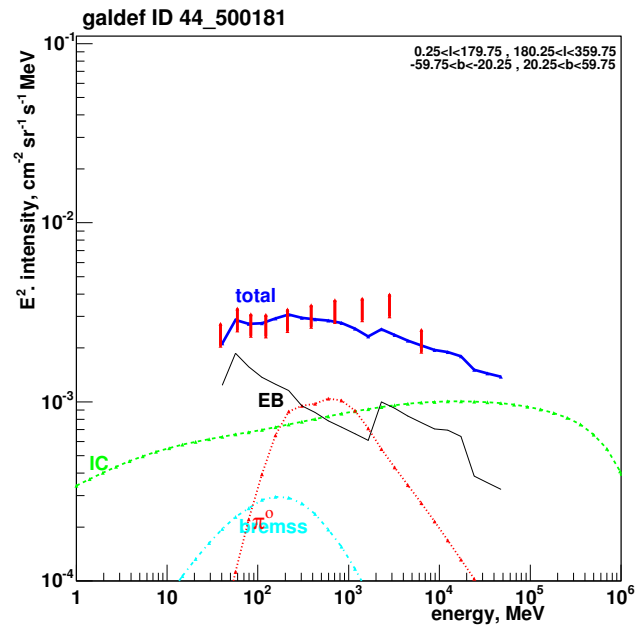
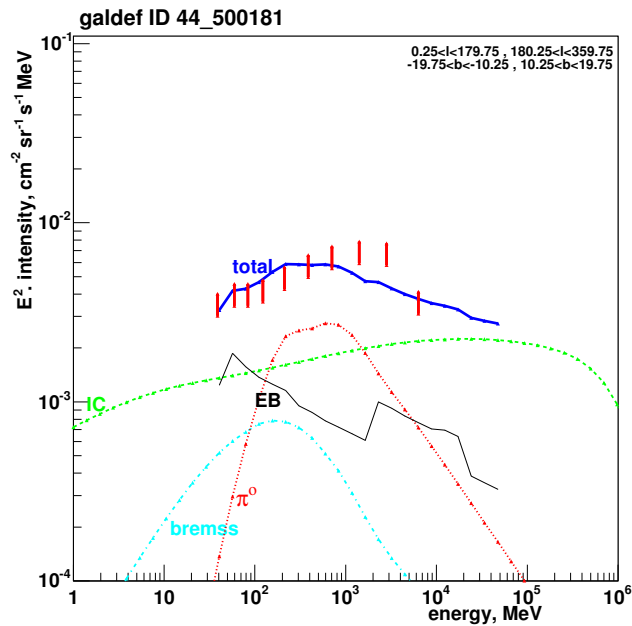
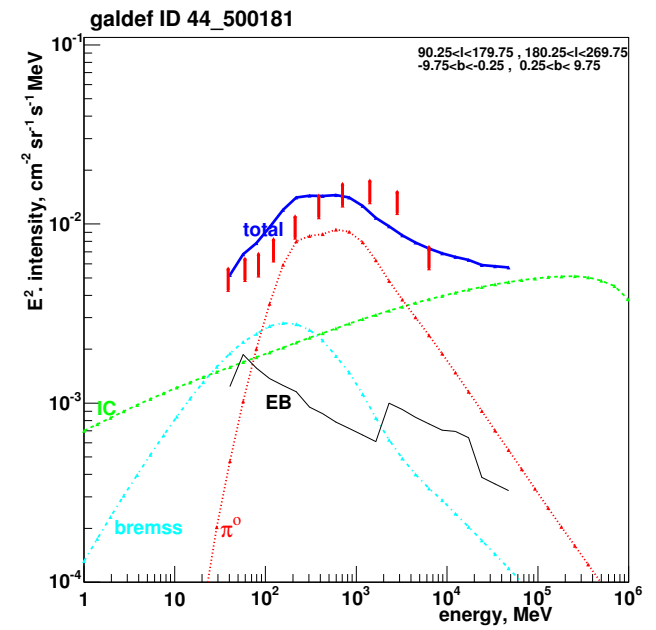
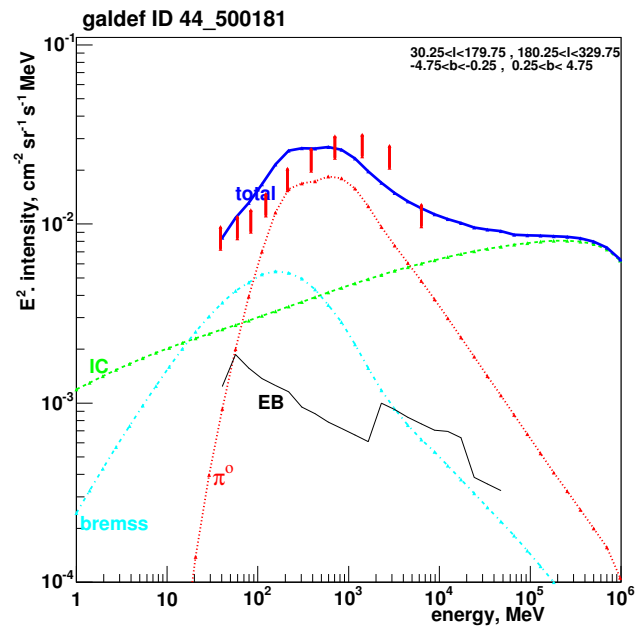
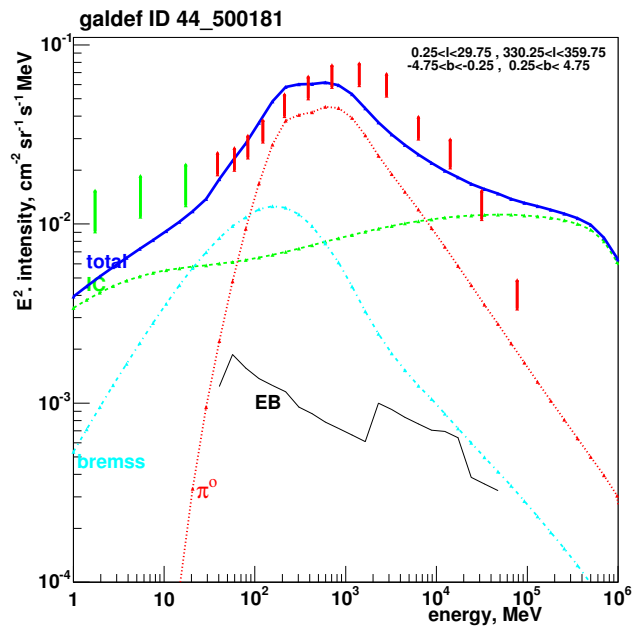


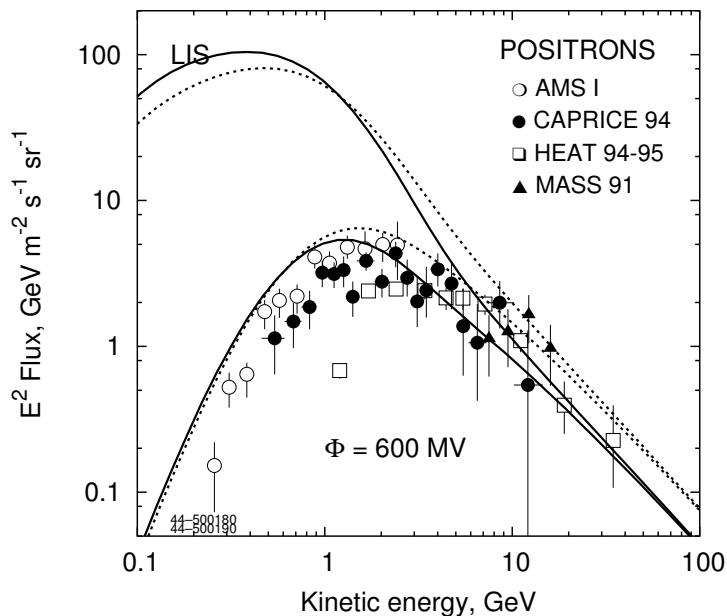
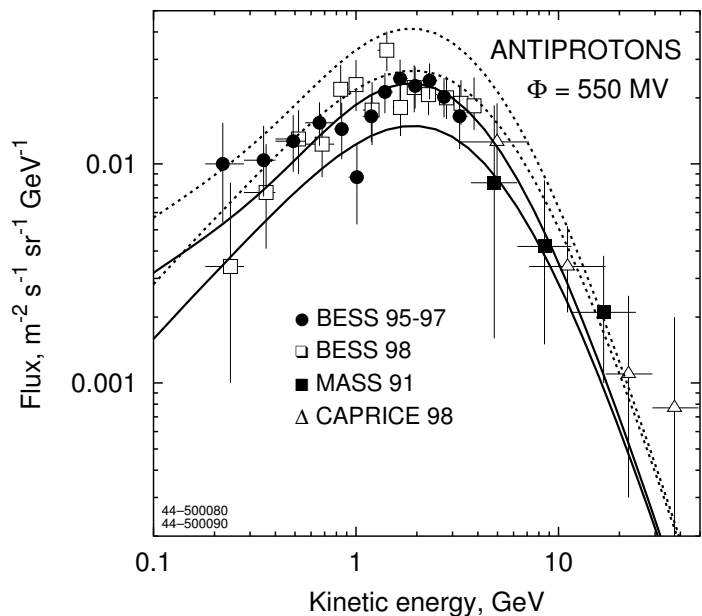
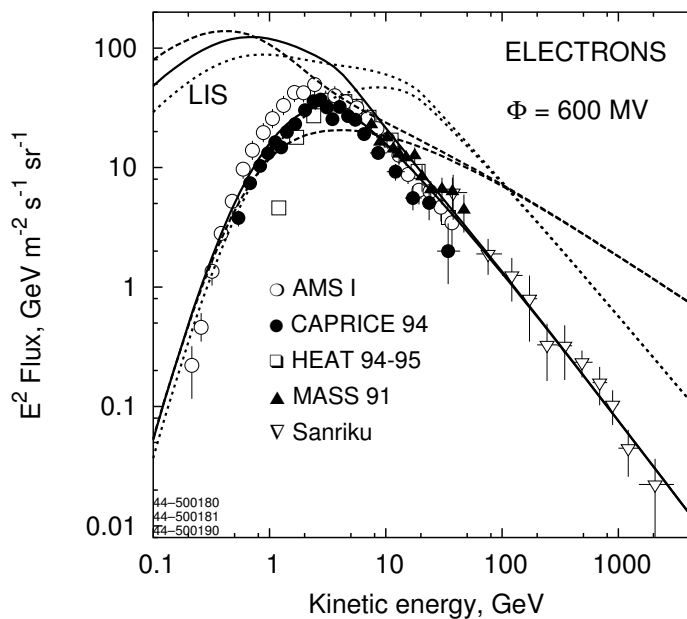
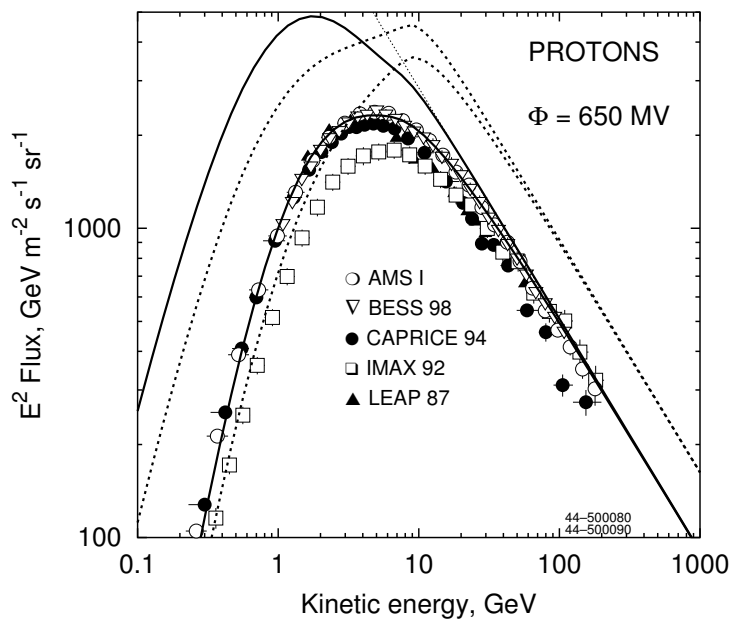
Citations/Publication Year for 1997ApJ...481..205H



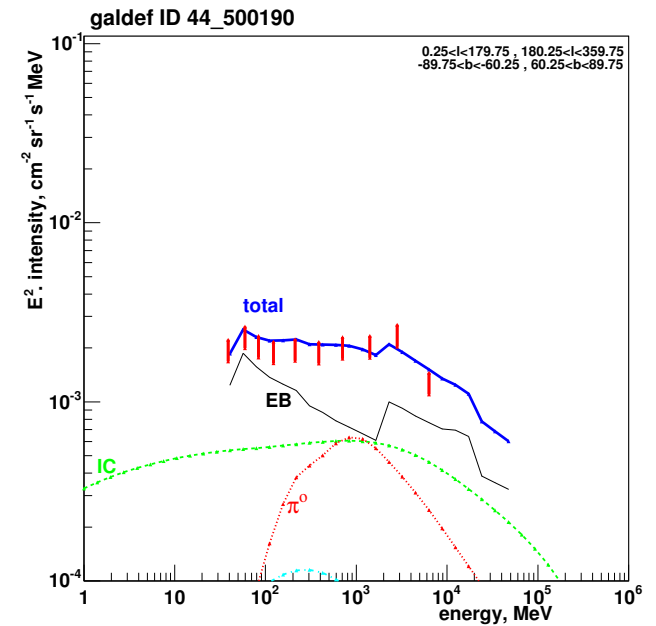
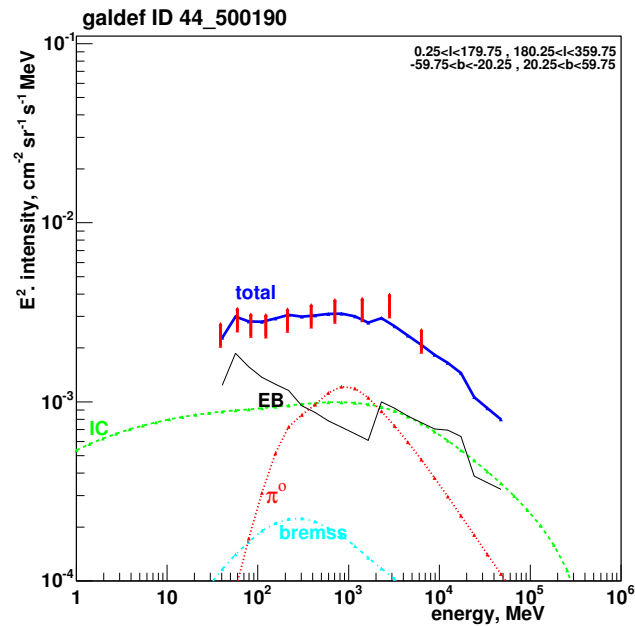
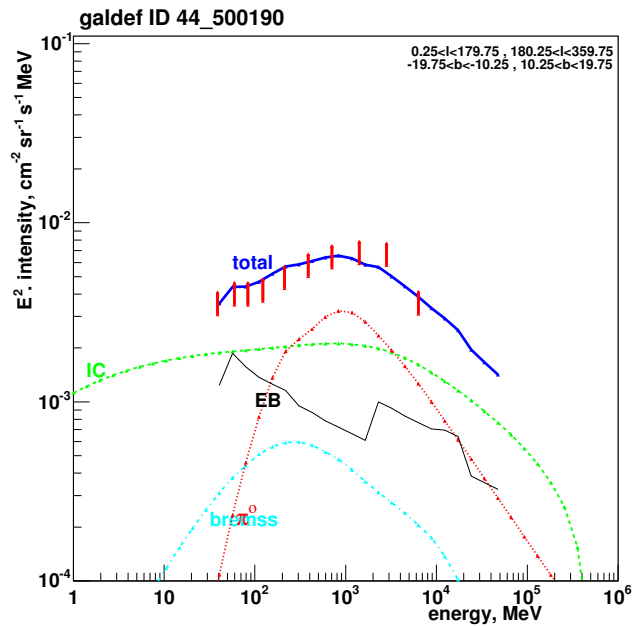
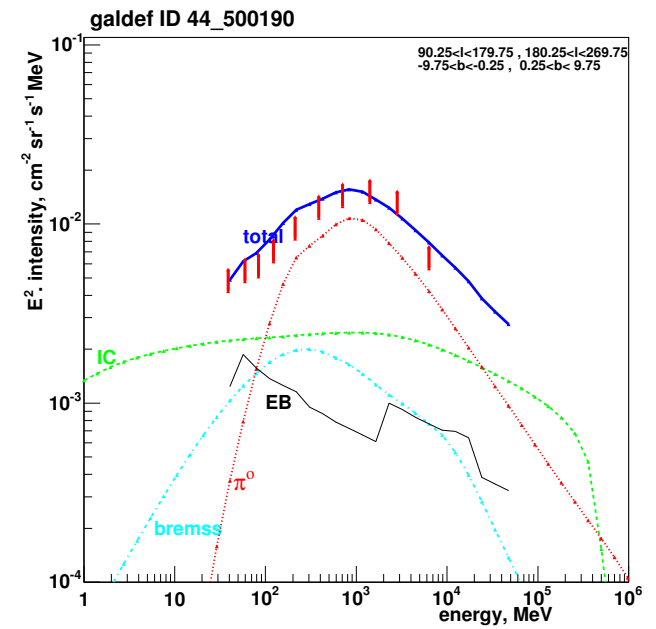
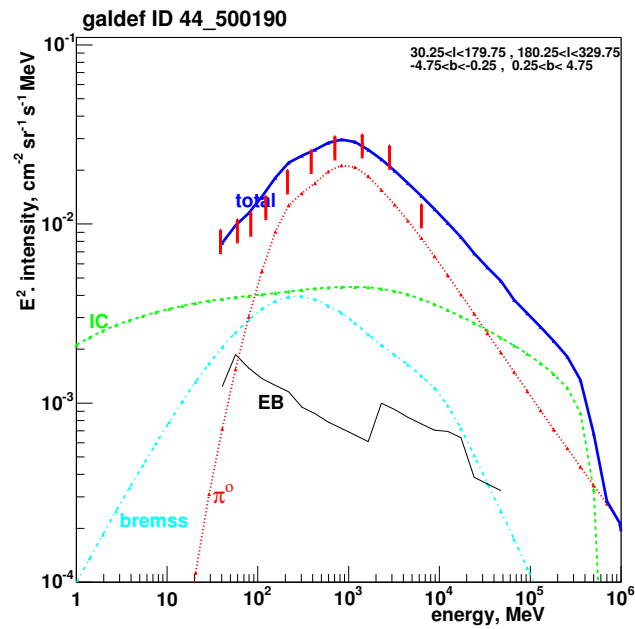
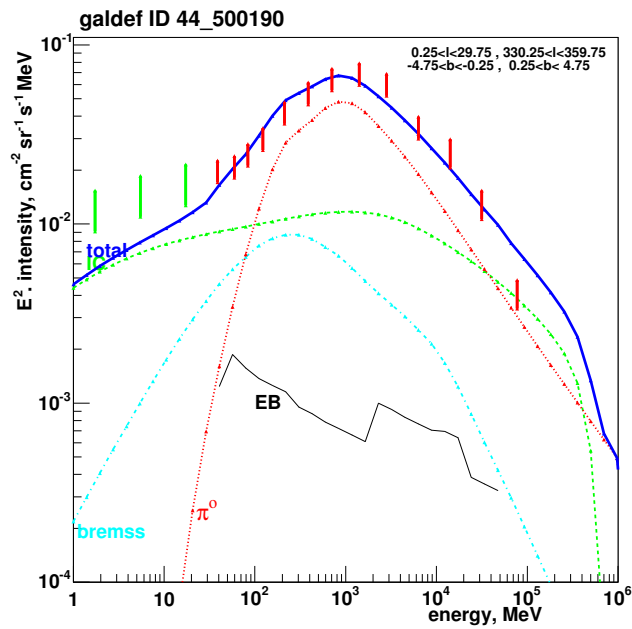
EGRET excess: conventional model



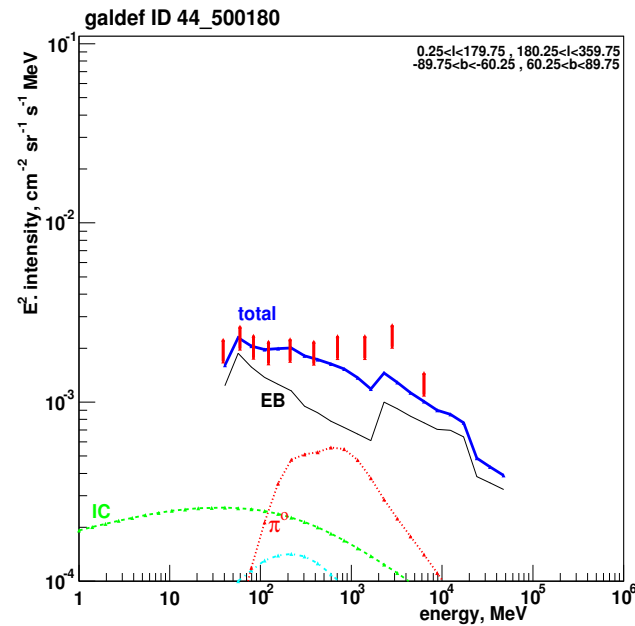
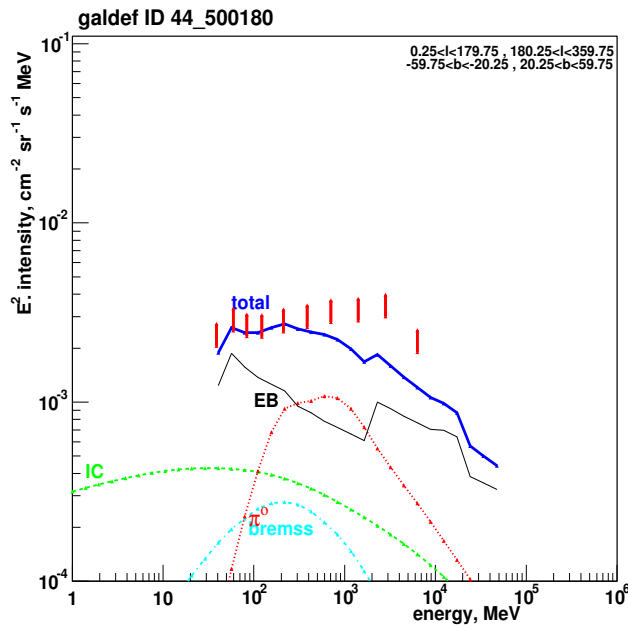
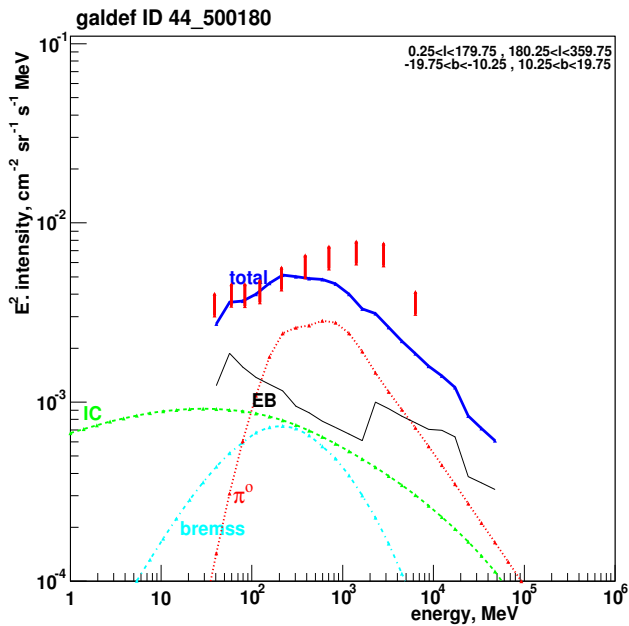
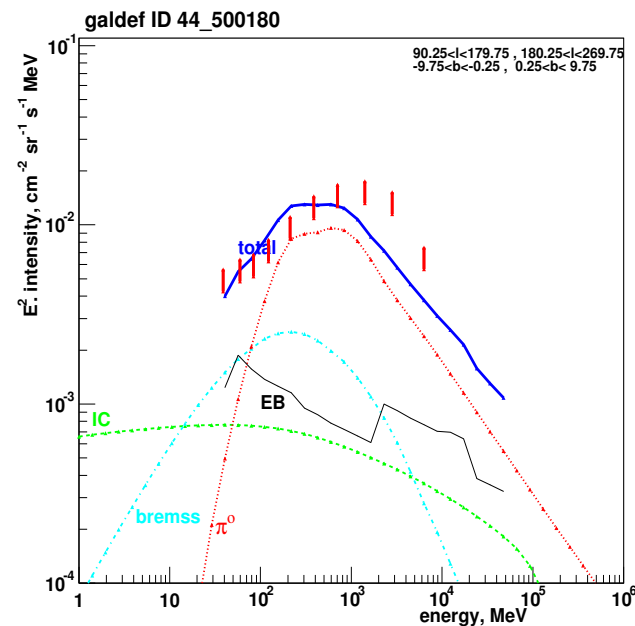
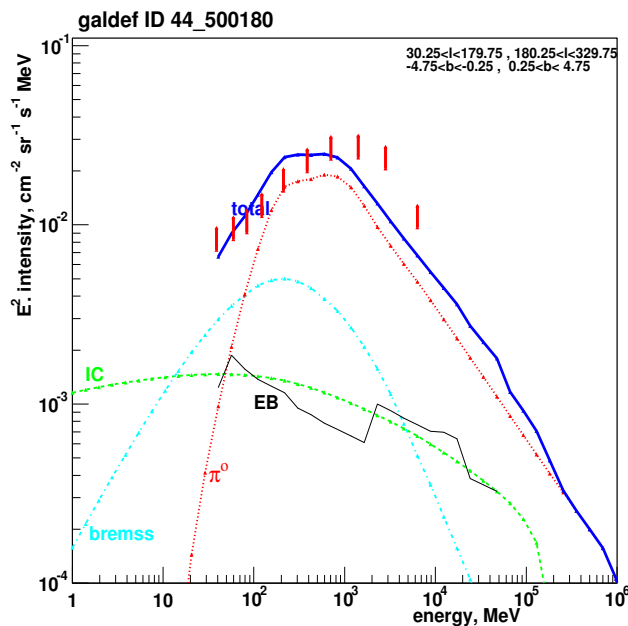
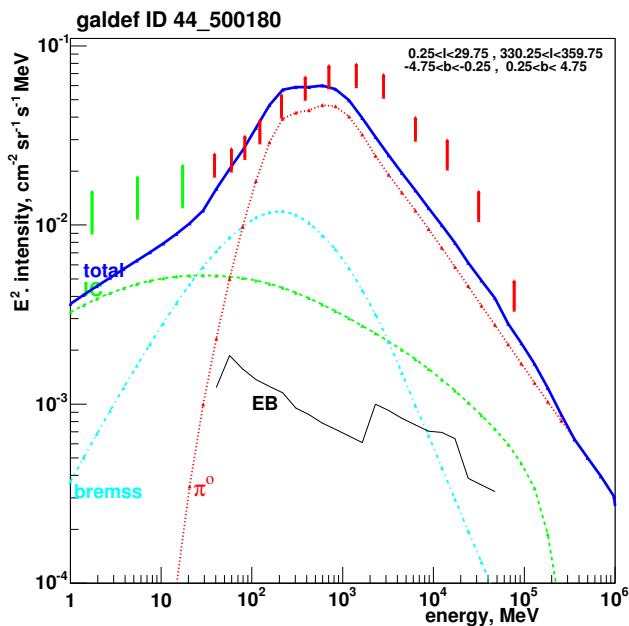


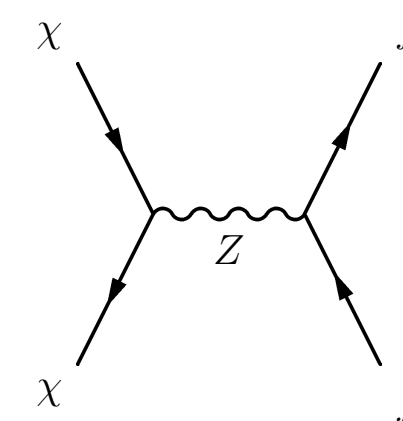
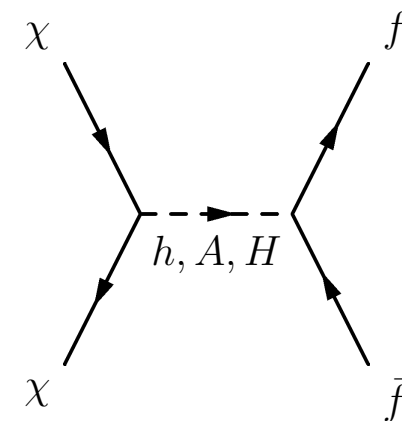
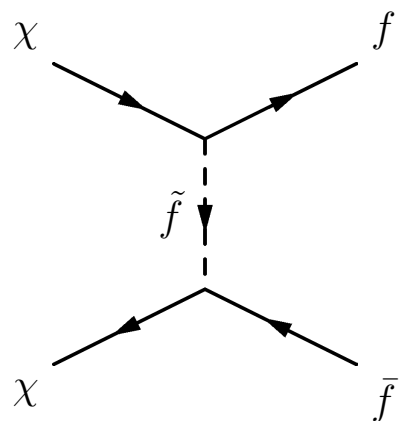
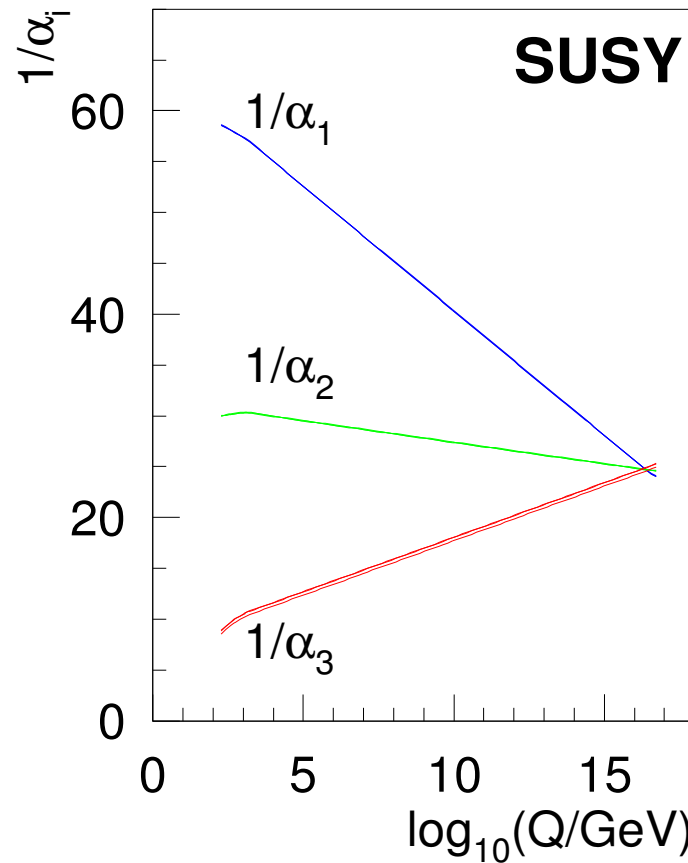
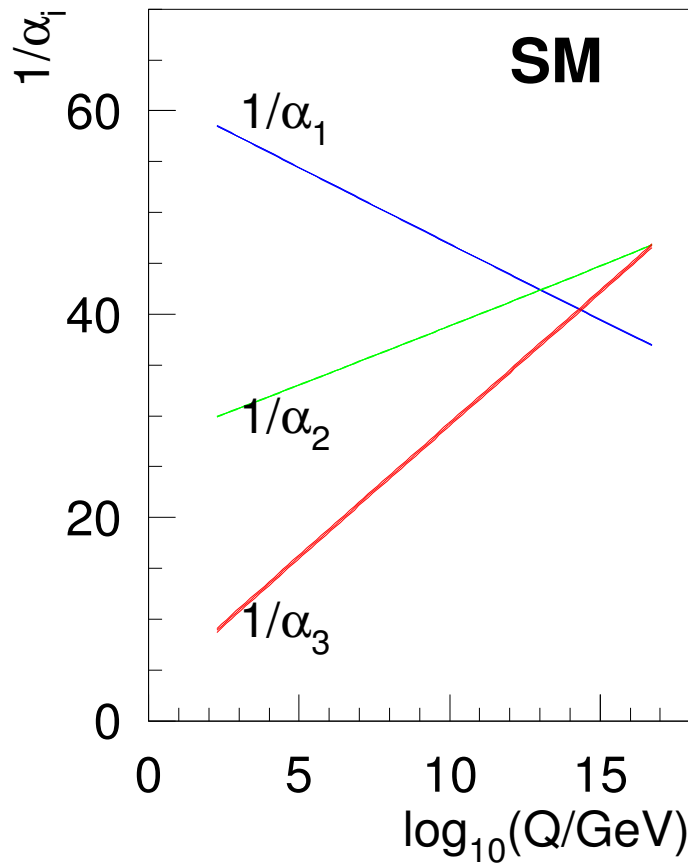


EGRET excess: optimized model

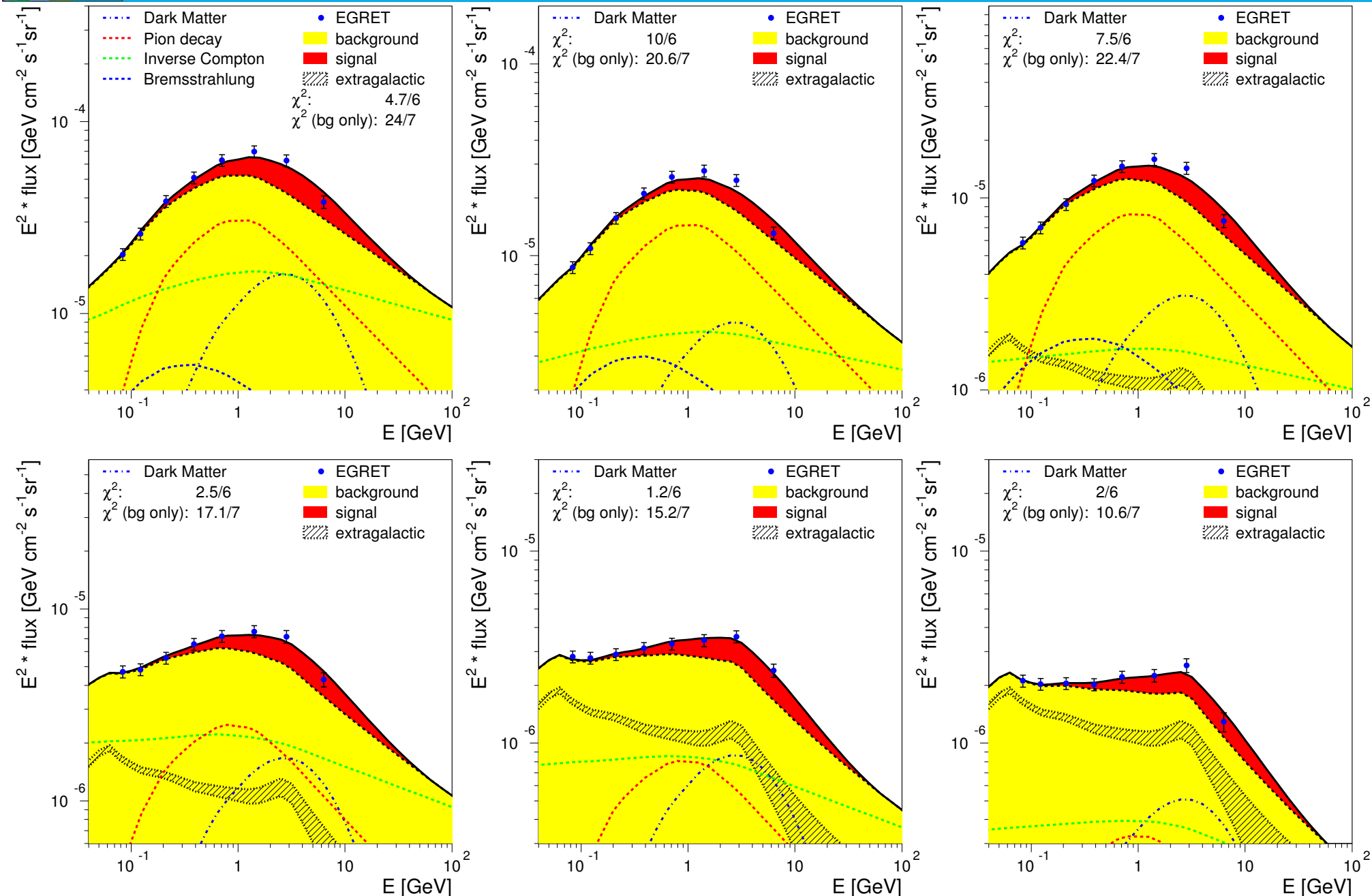


EGRET excess: conventional model

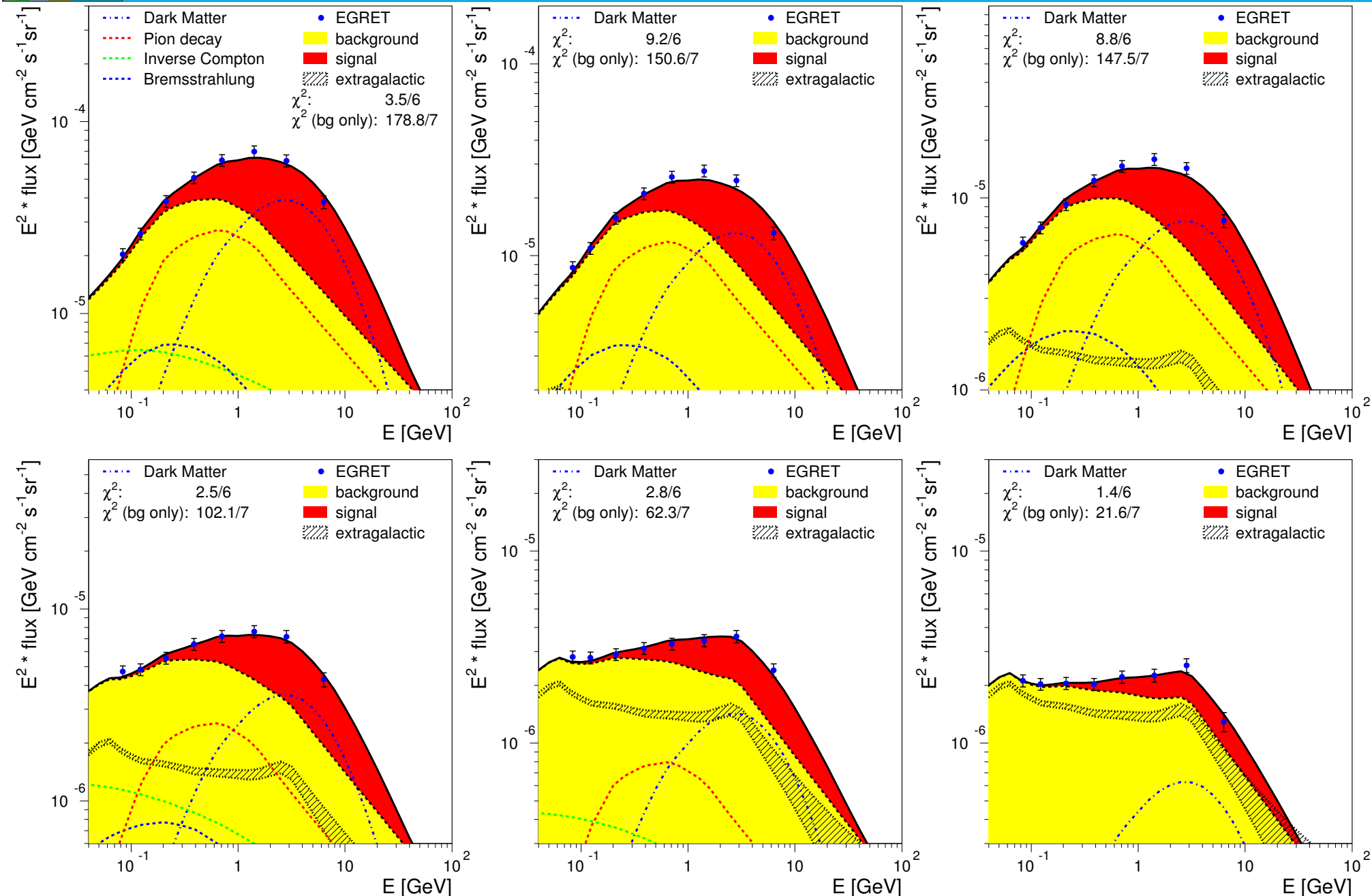




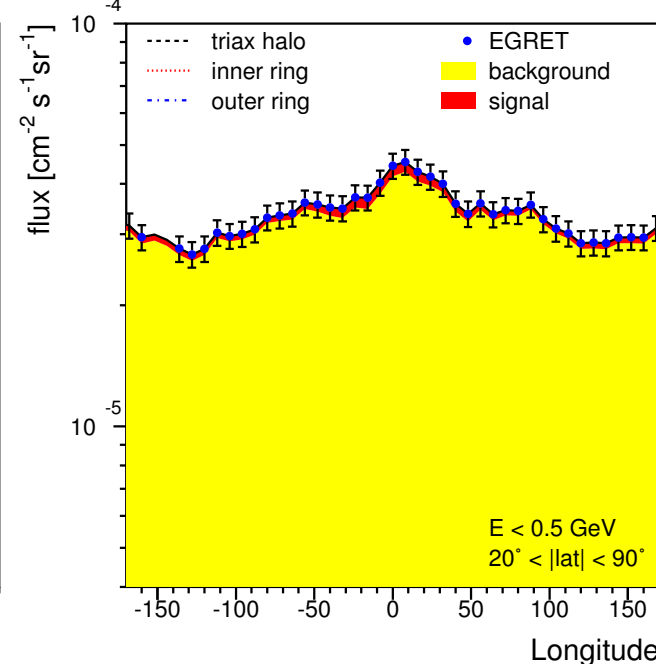
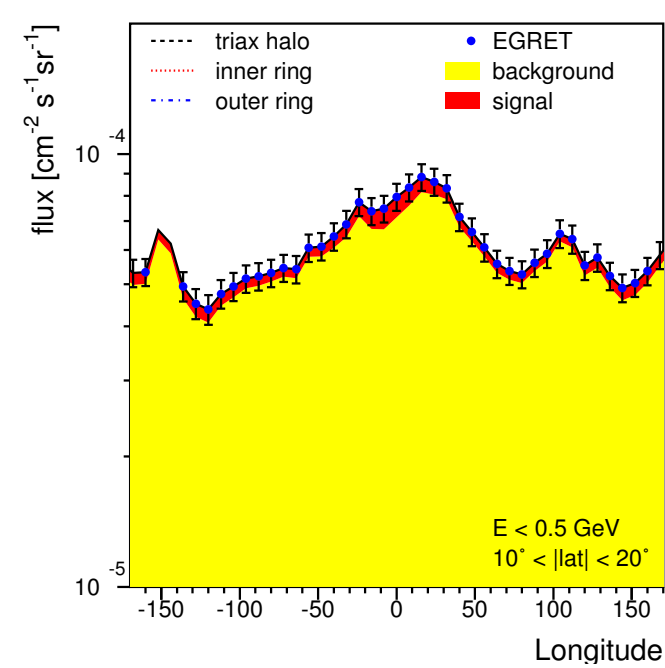
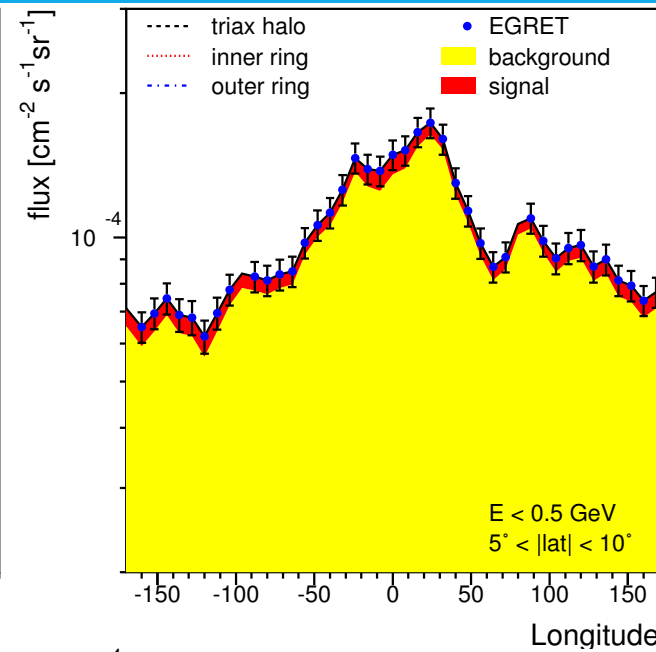
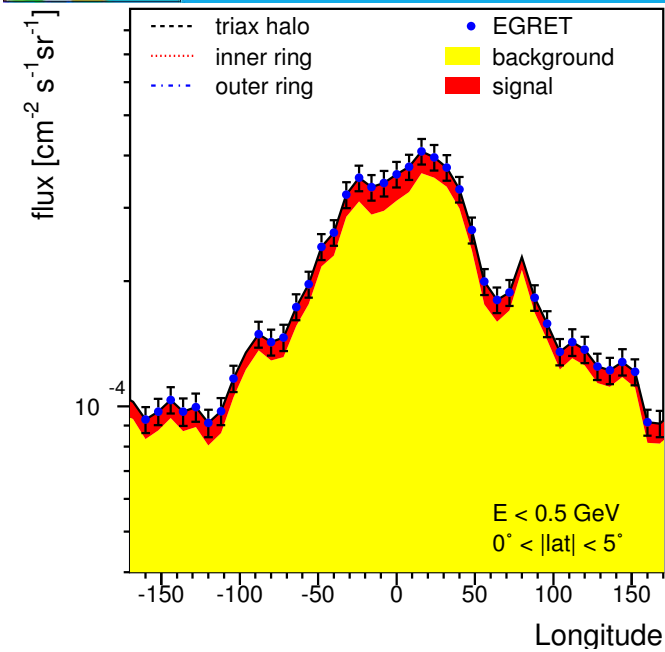
EGRET excess: optimized + DMA



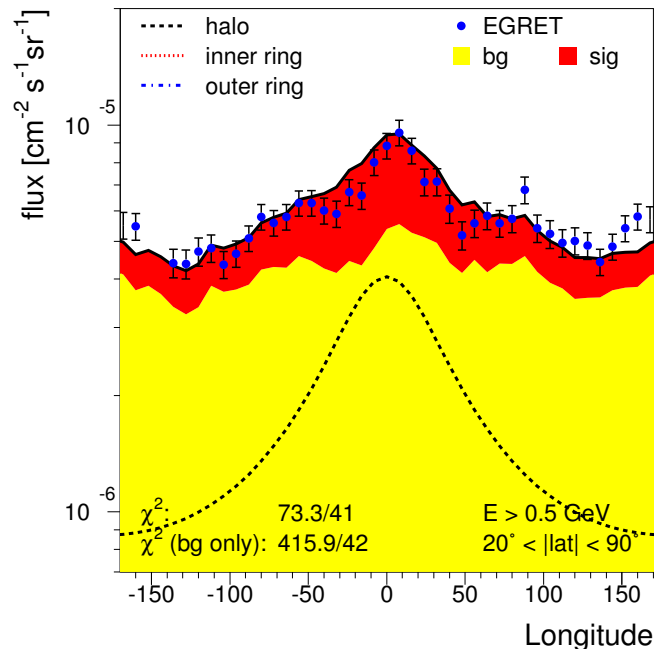
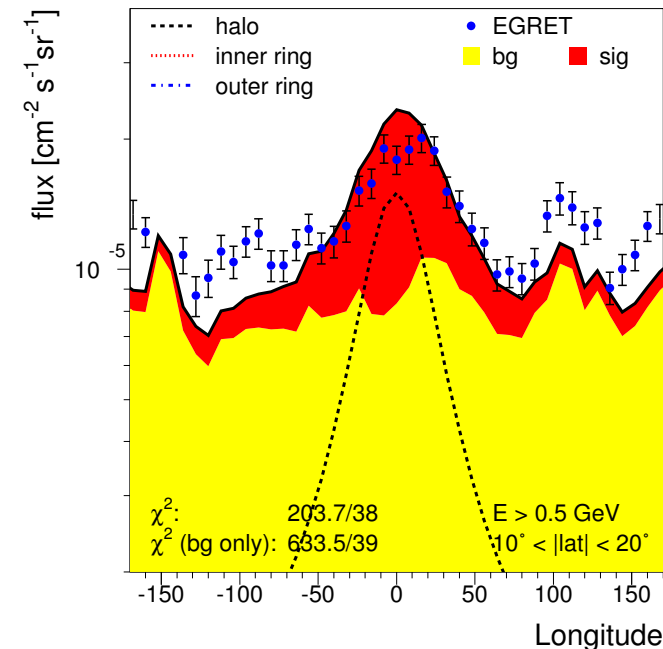
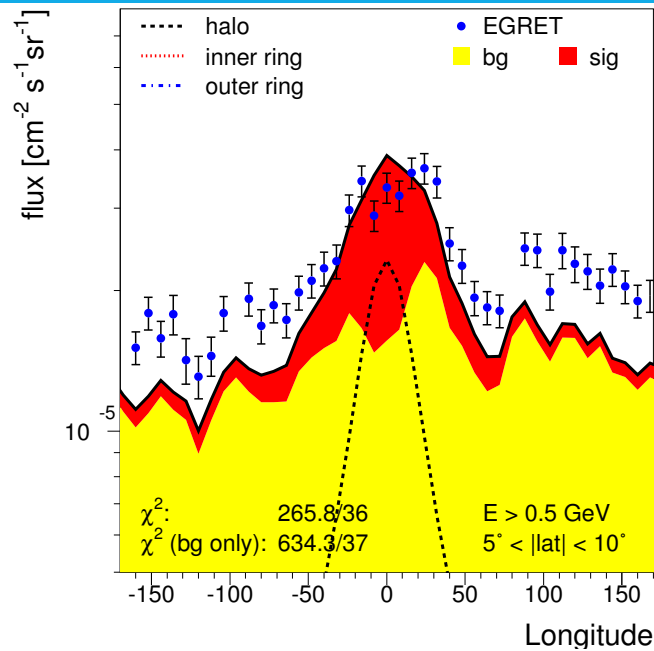
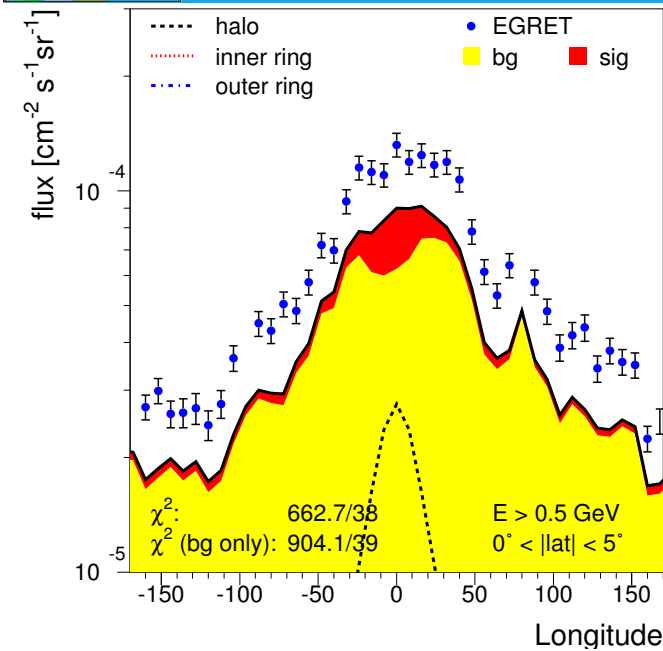
EGRET excess: conventional + DMA



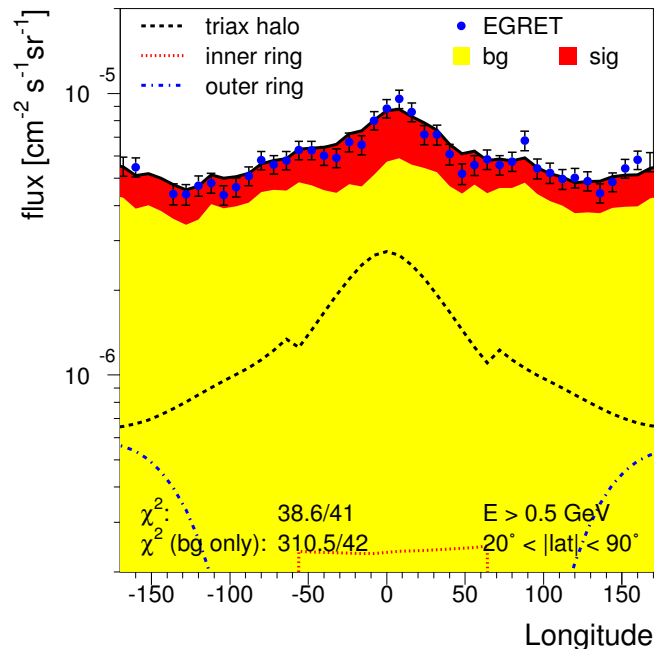
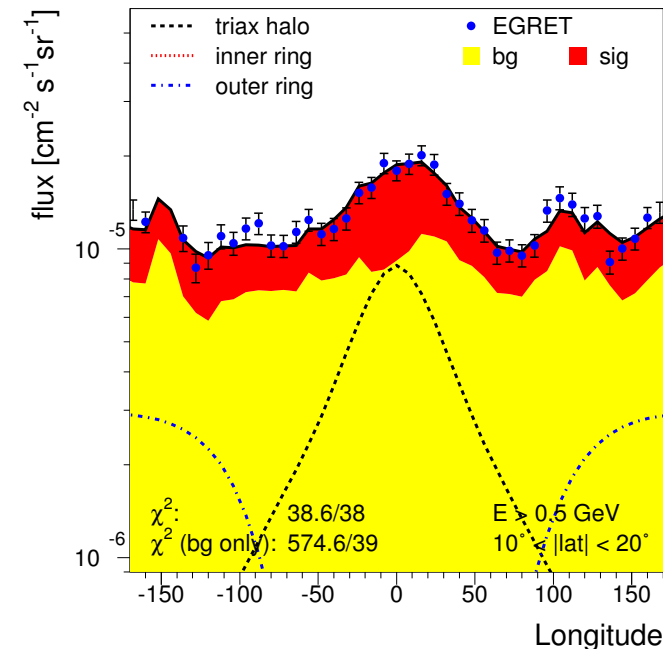
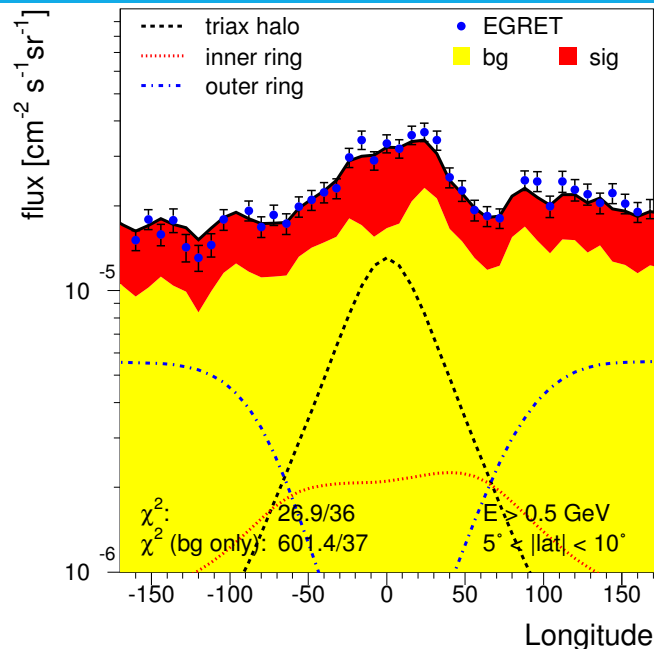
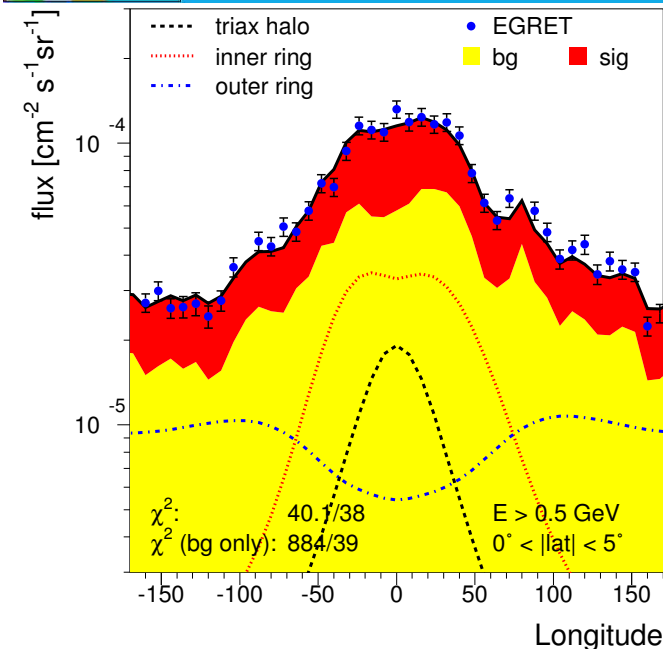
EGRET excess: below 0.5 GeV



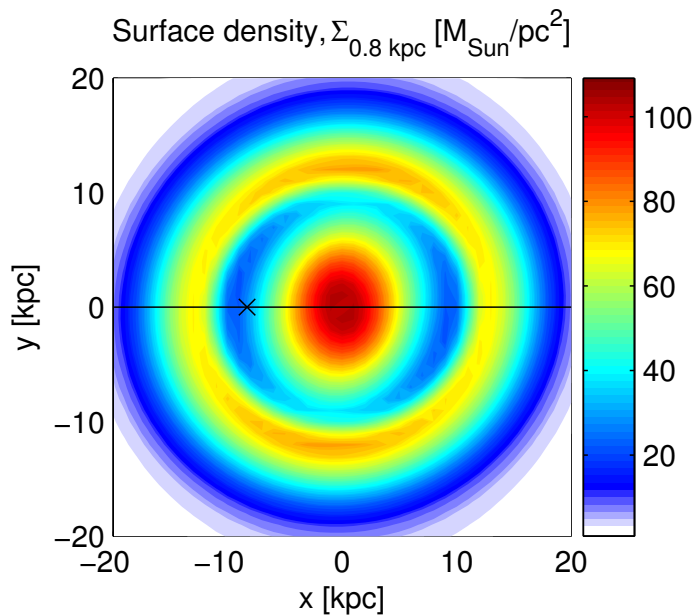
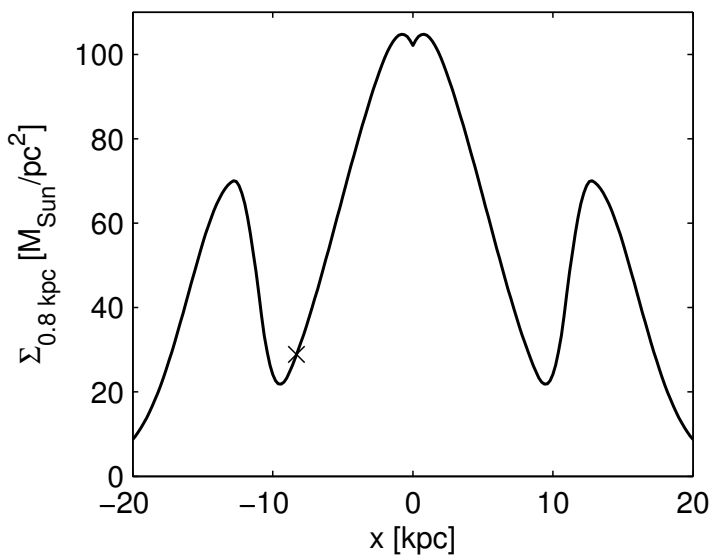
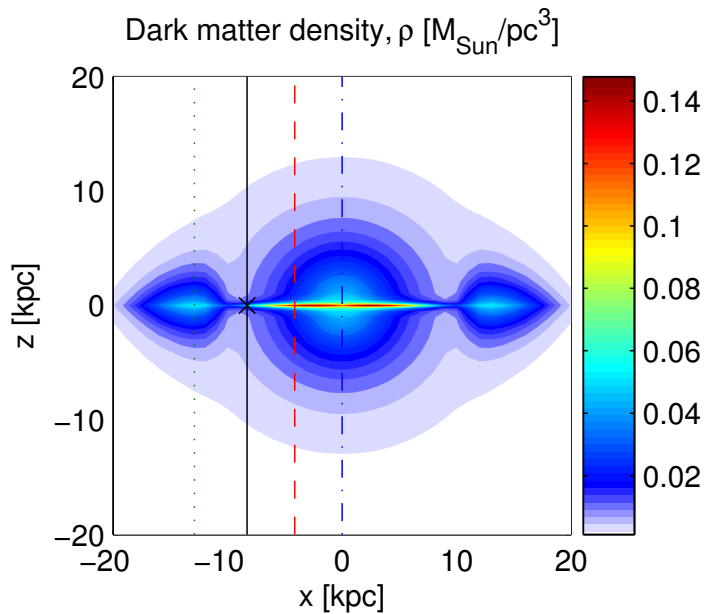
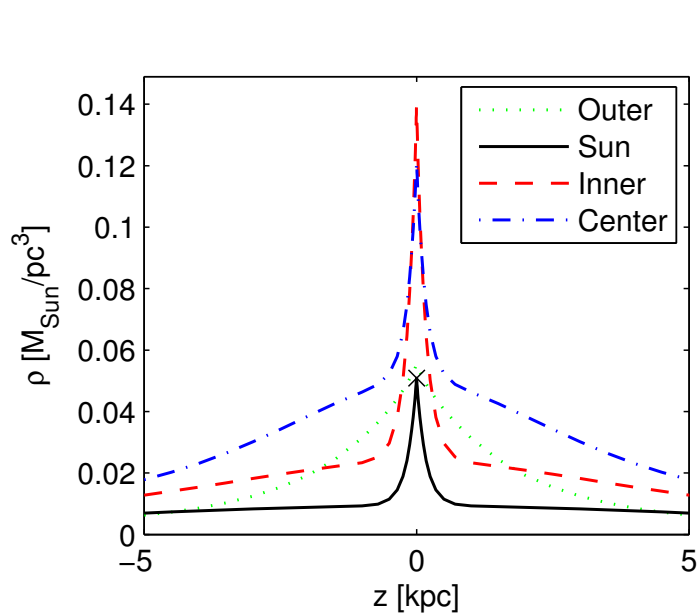
EGRET excess: above 0.5 GeV



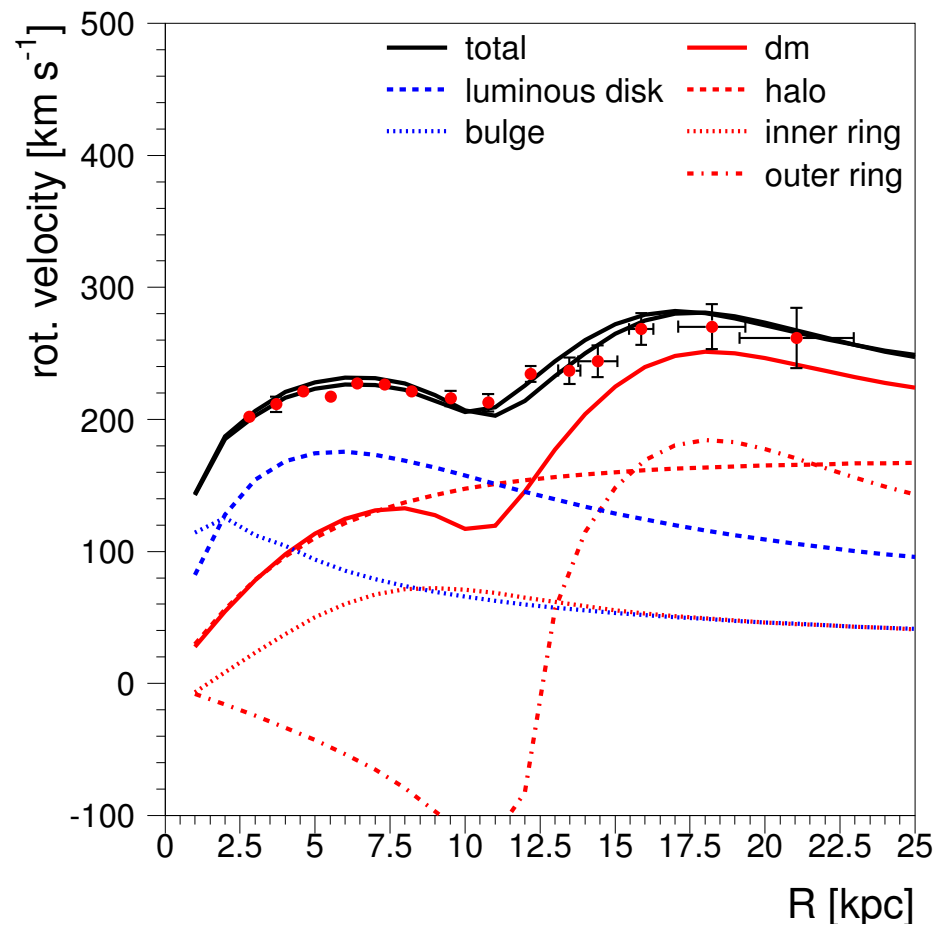
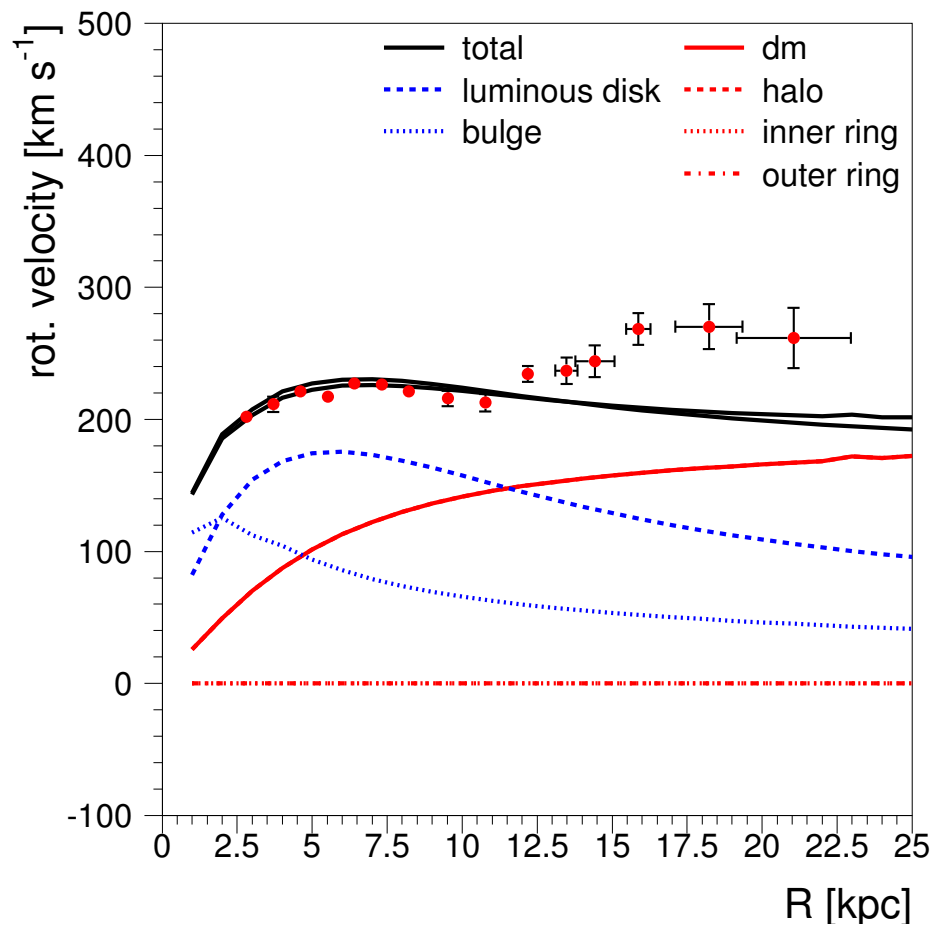
EGRET excess: above 0.5 GeV

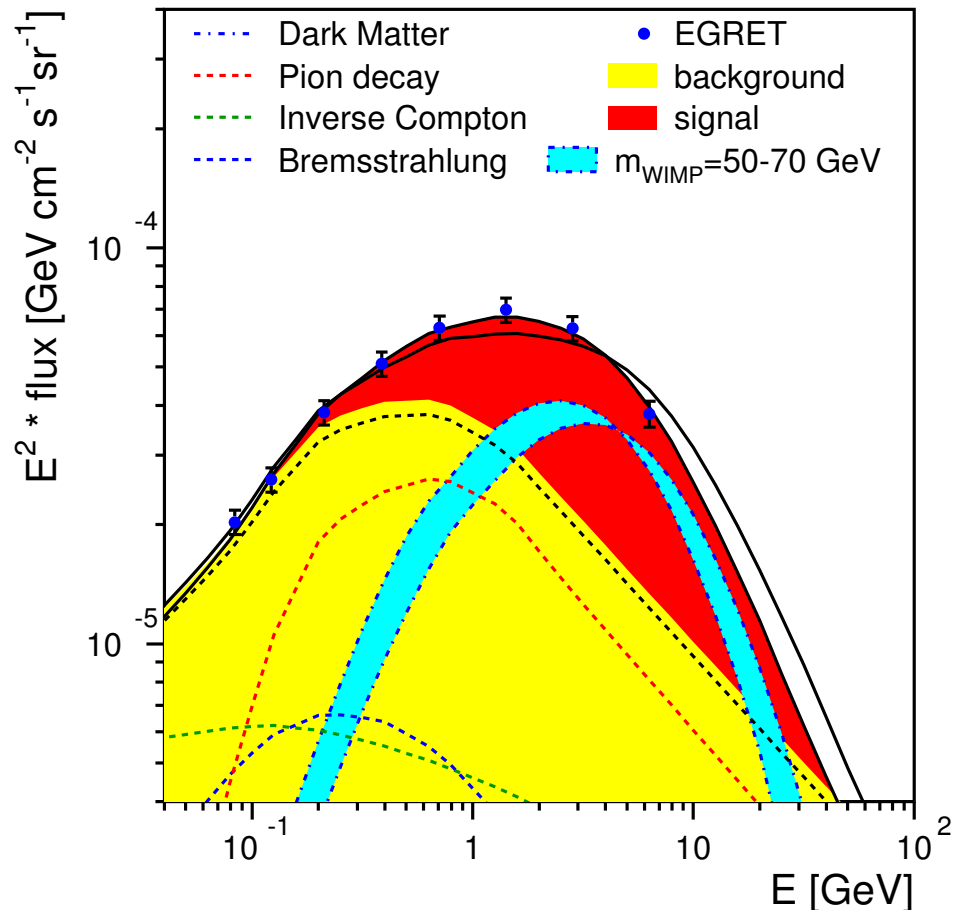


dark matter rings?

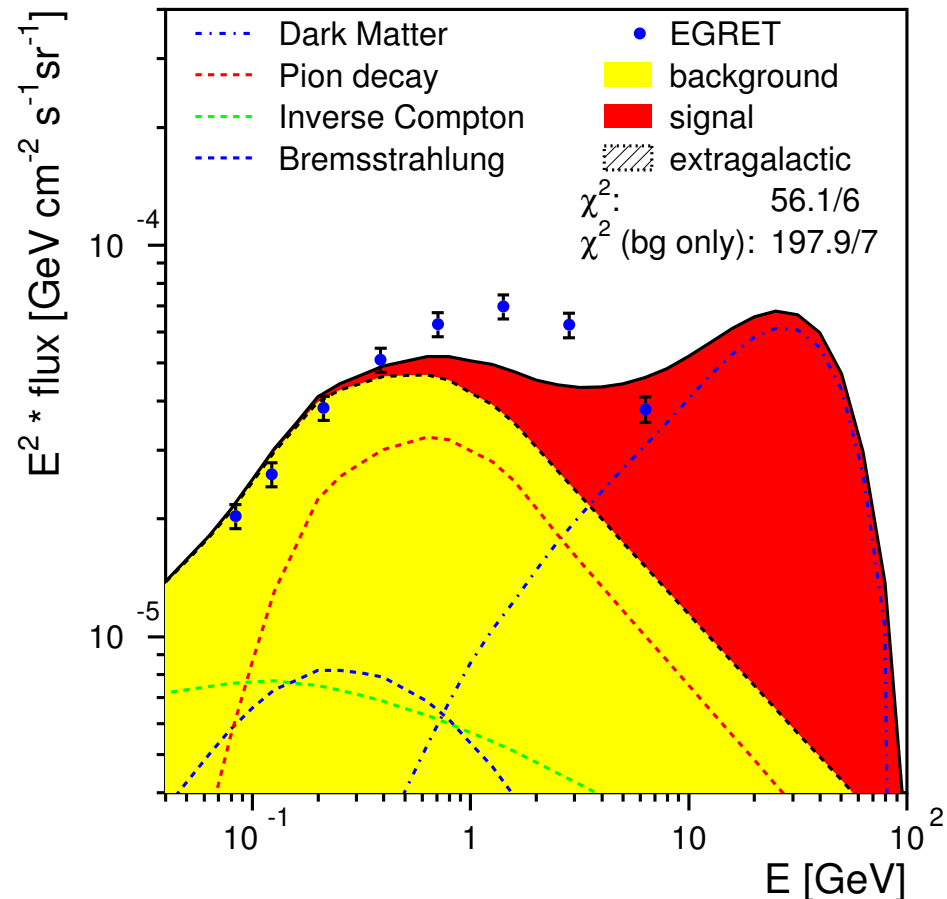


rotation curve

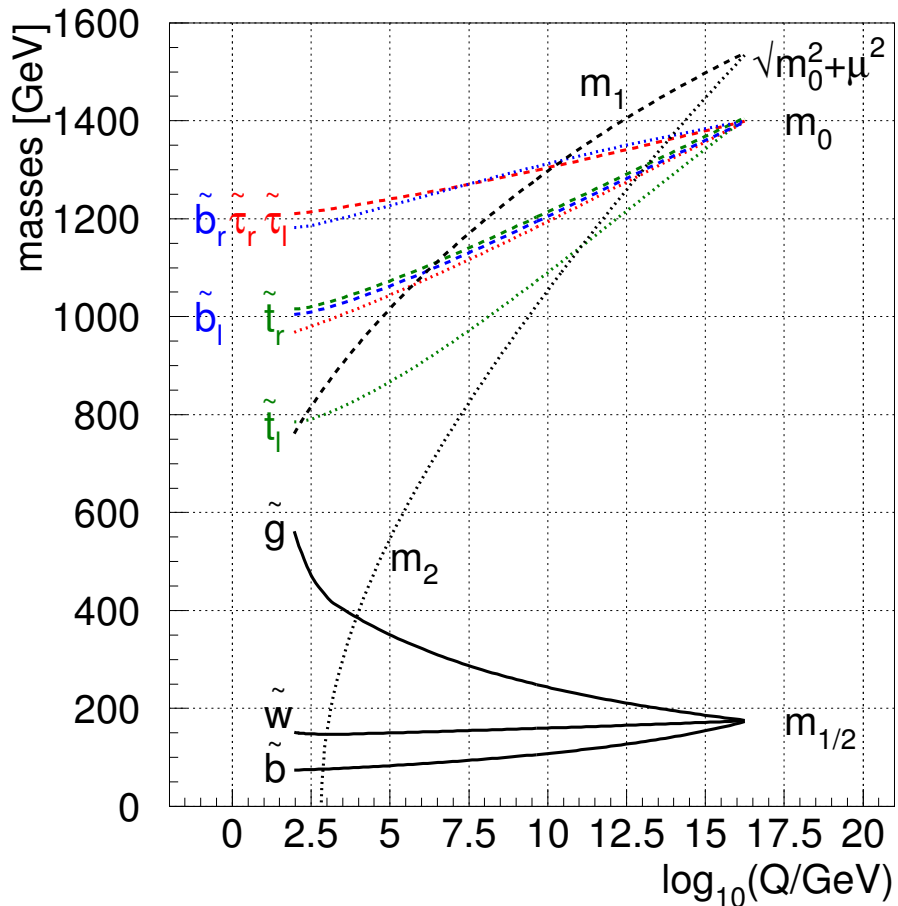
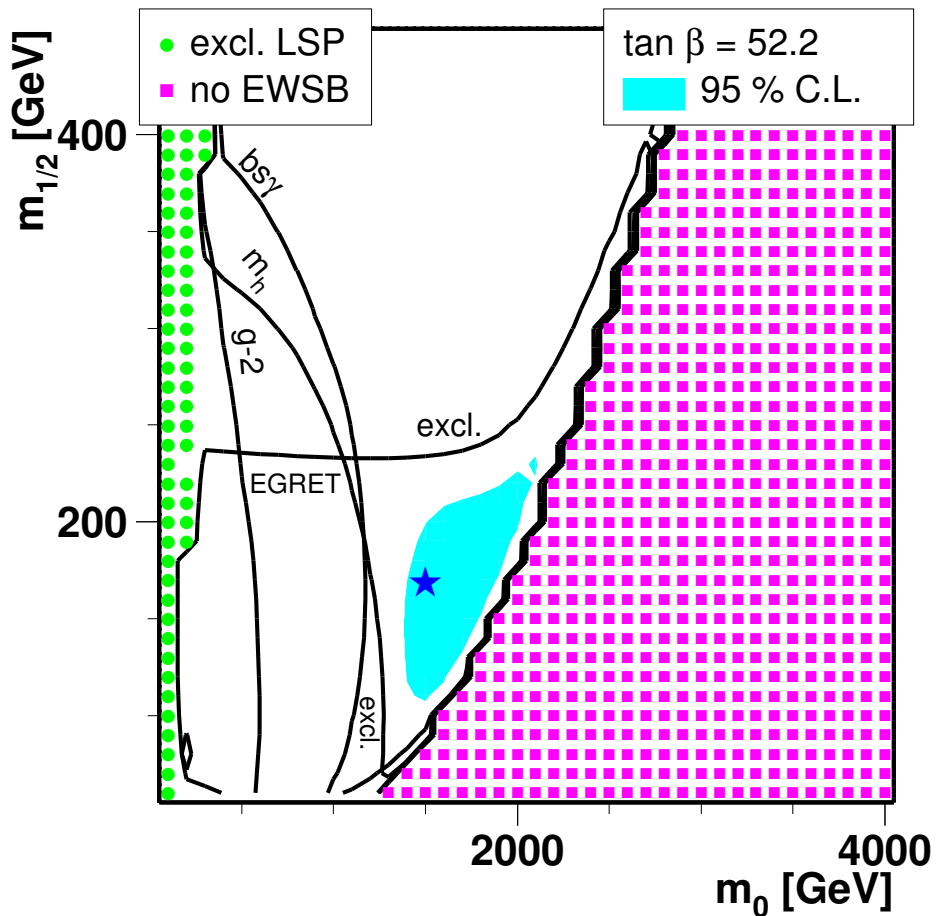


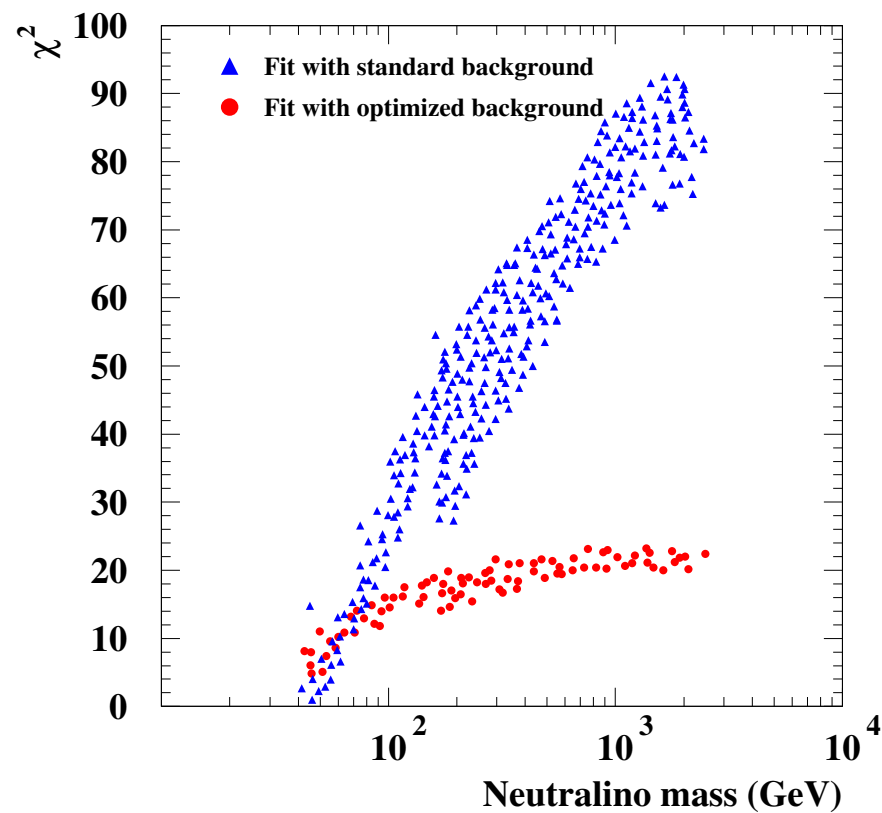
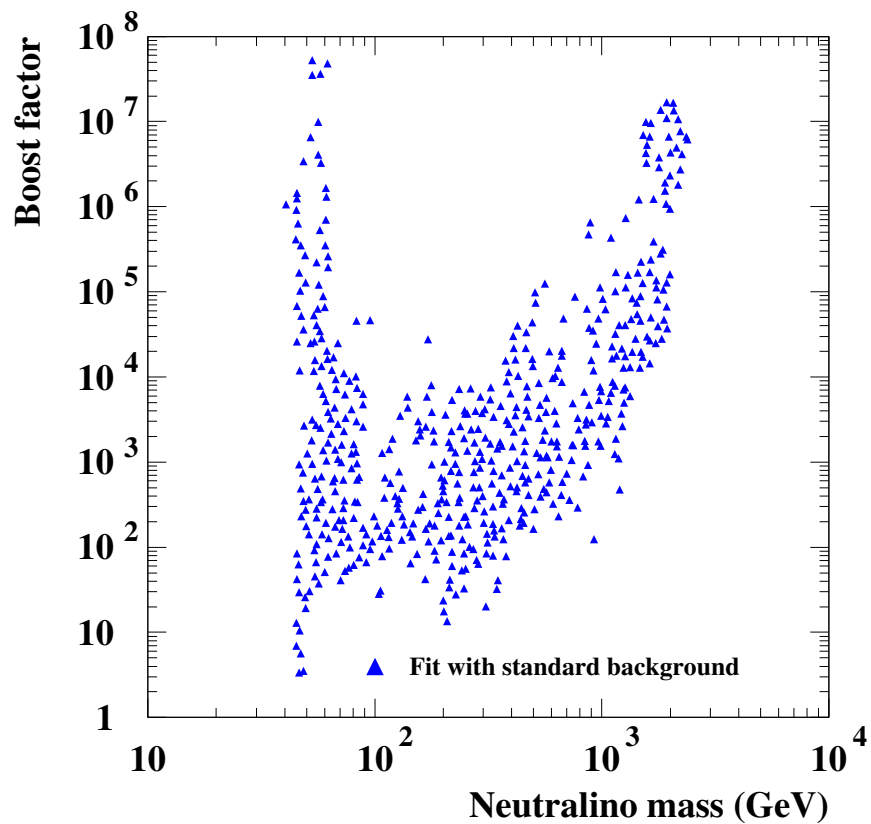


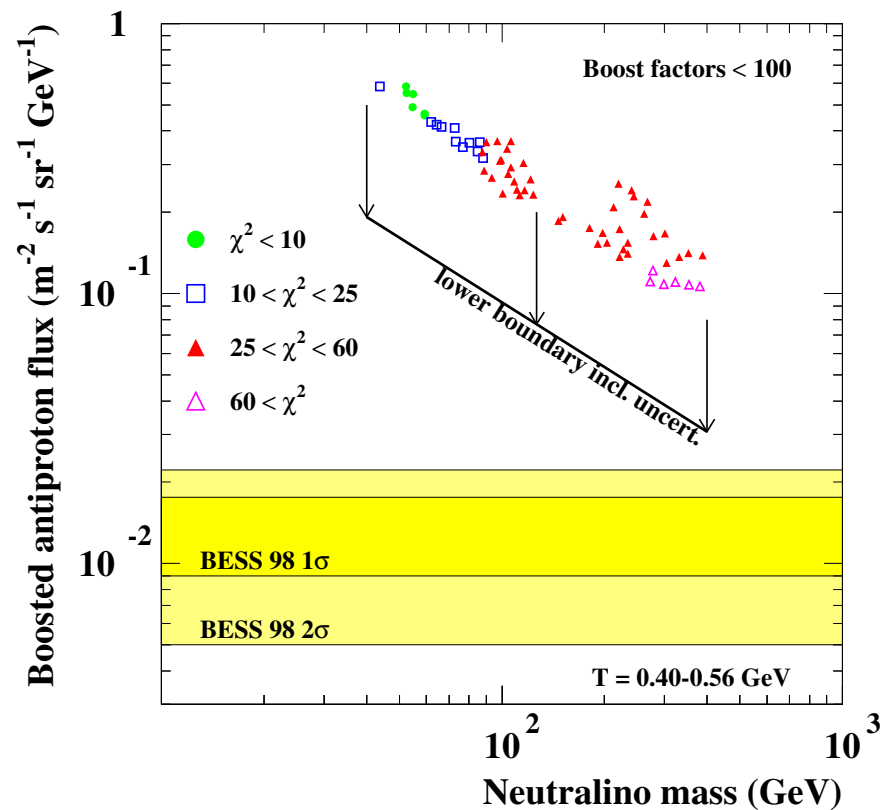
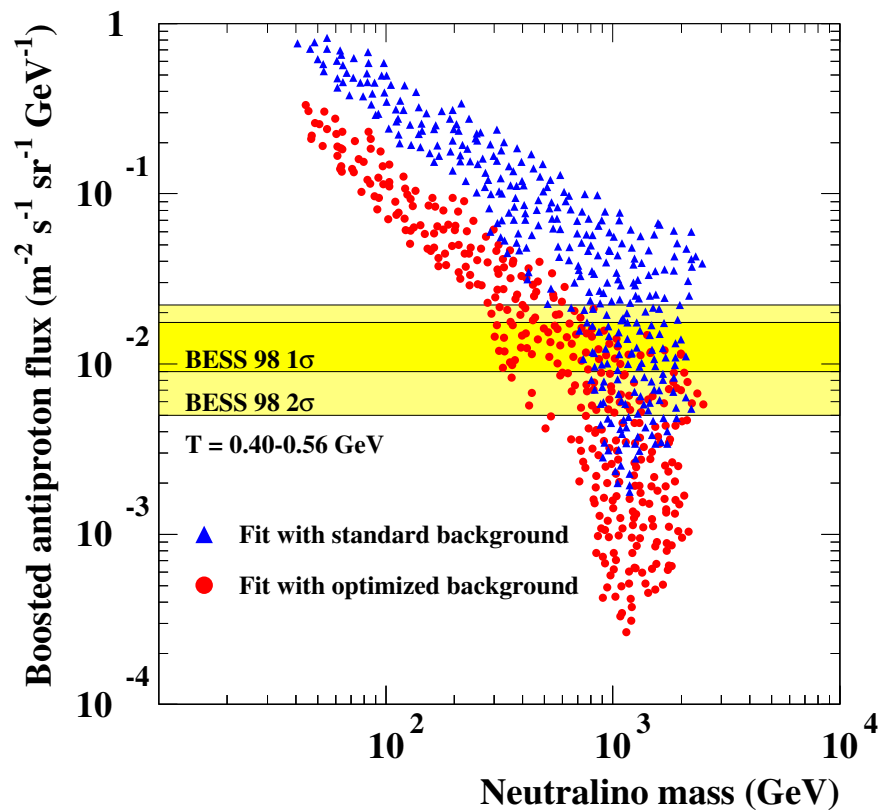
$m_0 = 1400 \text{ GeV}$
 $m_{1/2} = 175 \text{ GeV}$
 $\tan \beta = 51$
 annihilation into $b\bar{b}$ dominates

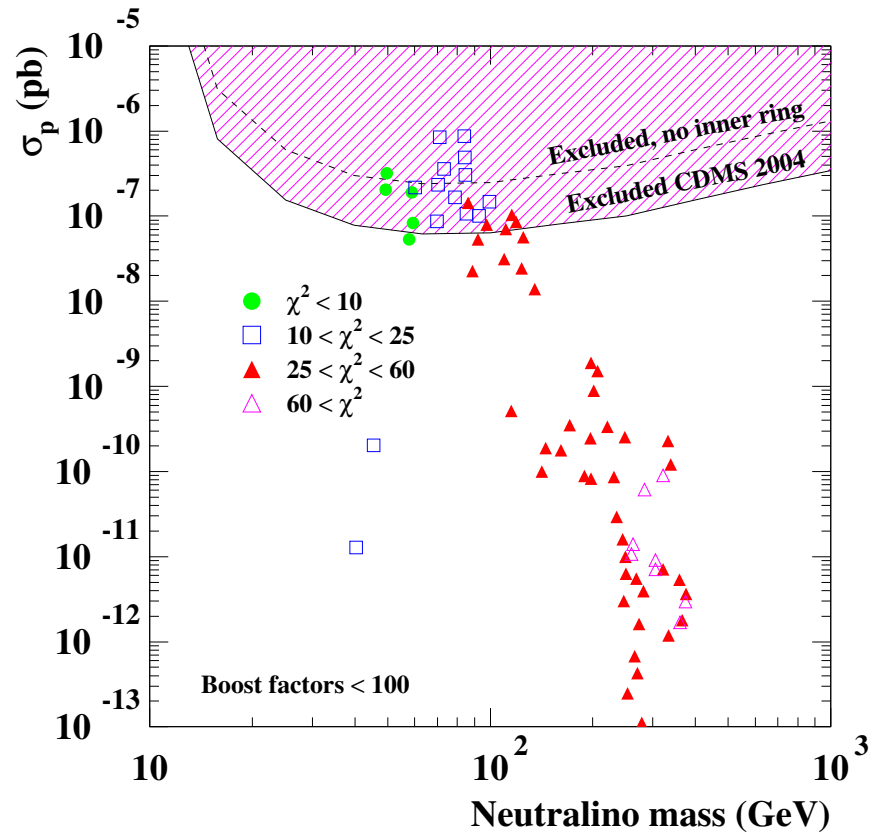
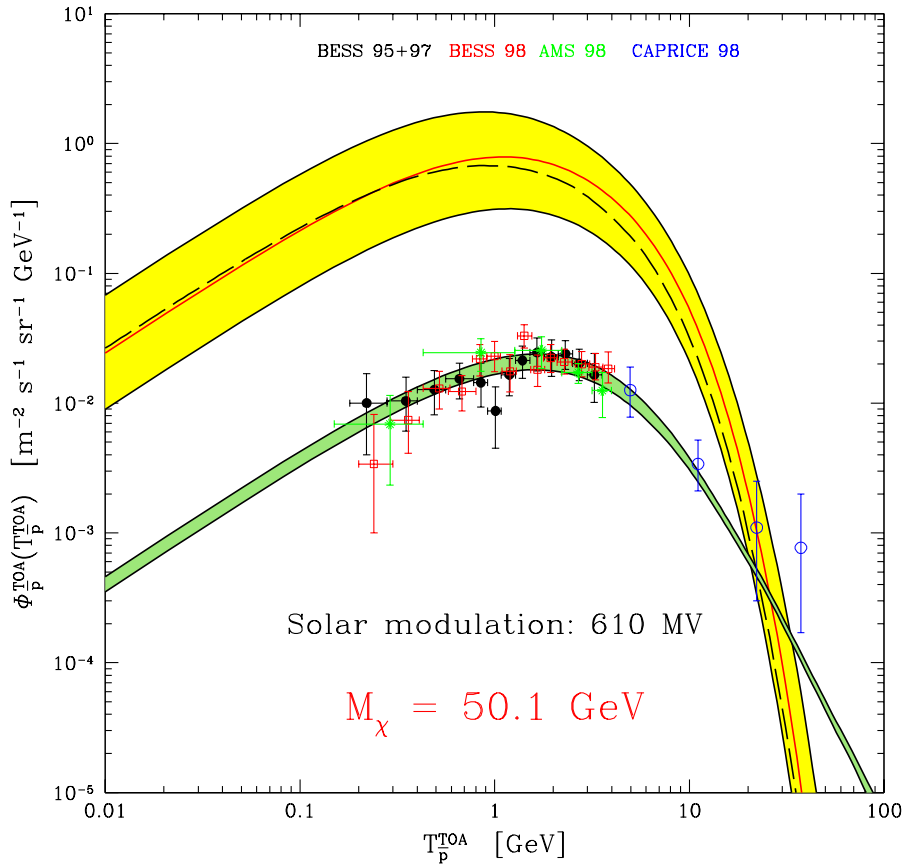


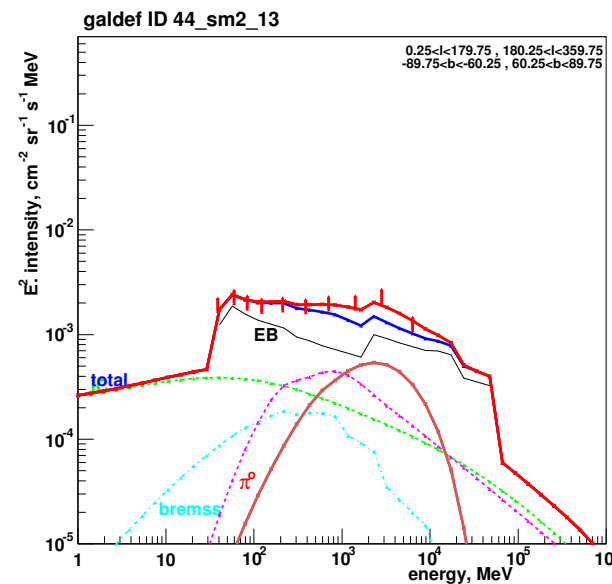
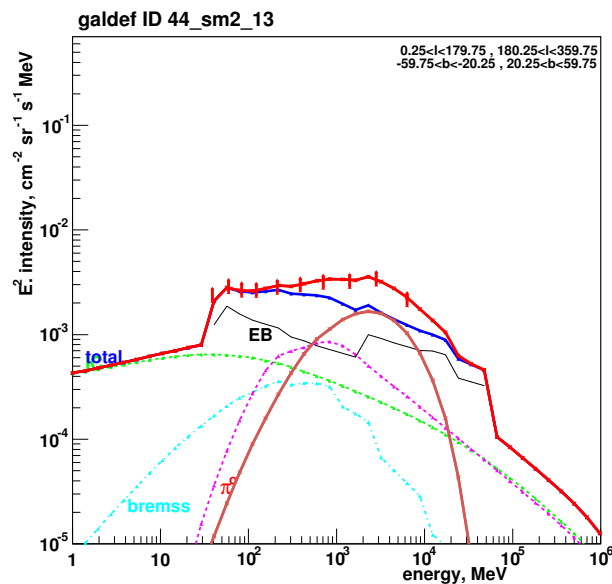
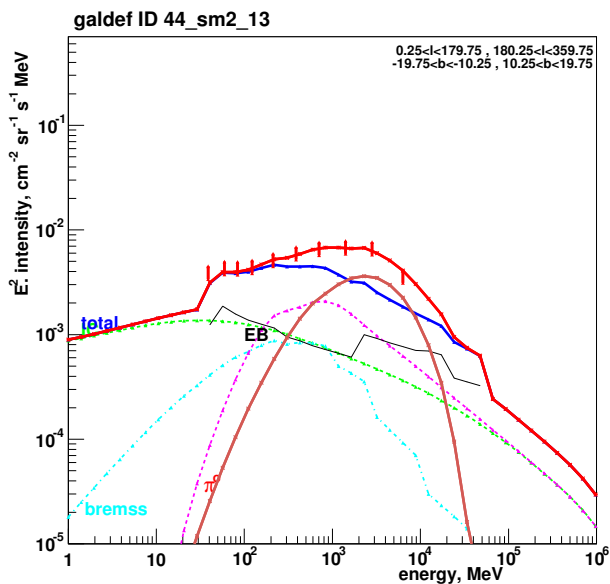
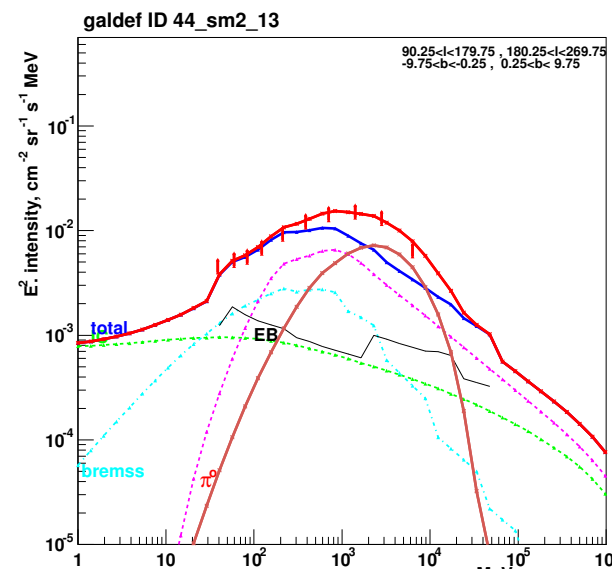
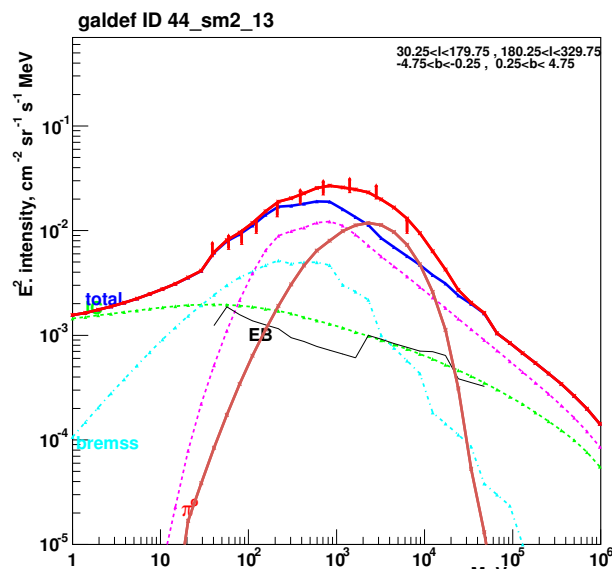
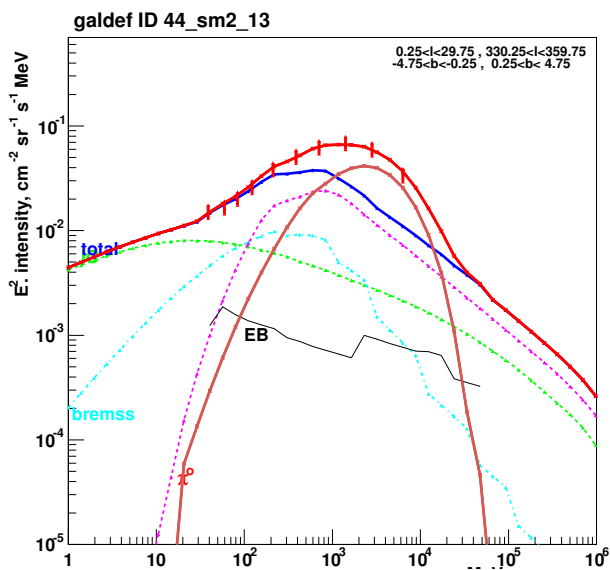
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 $m_{1/2} = 250 \text{ GeV}$
 $\tan \beta = 10$
 annihilation into $\tau^+\tau^-$ dominates



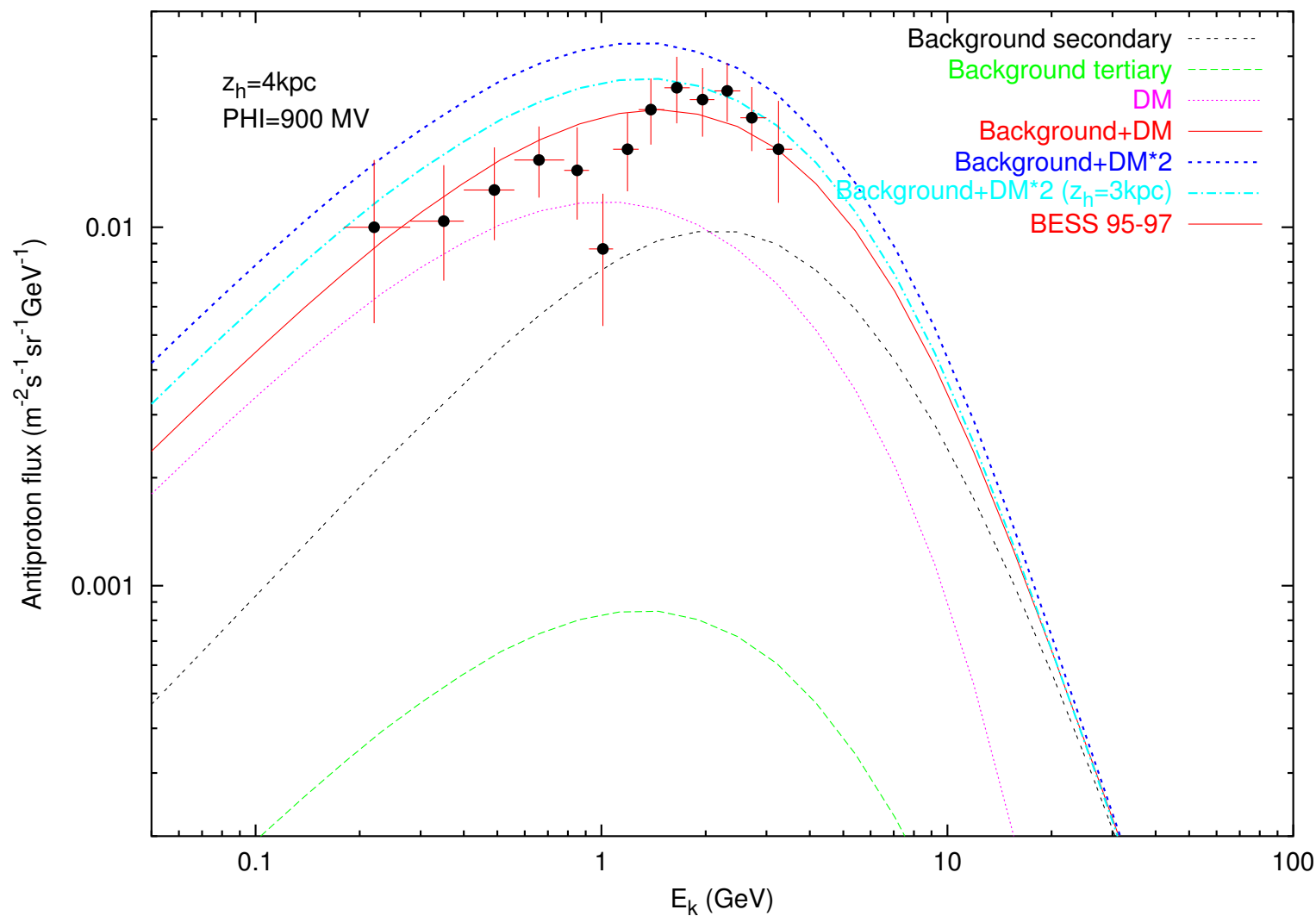


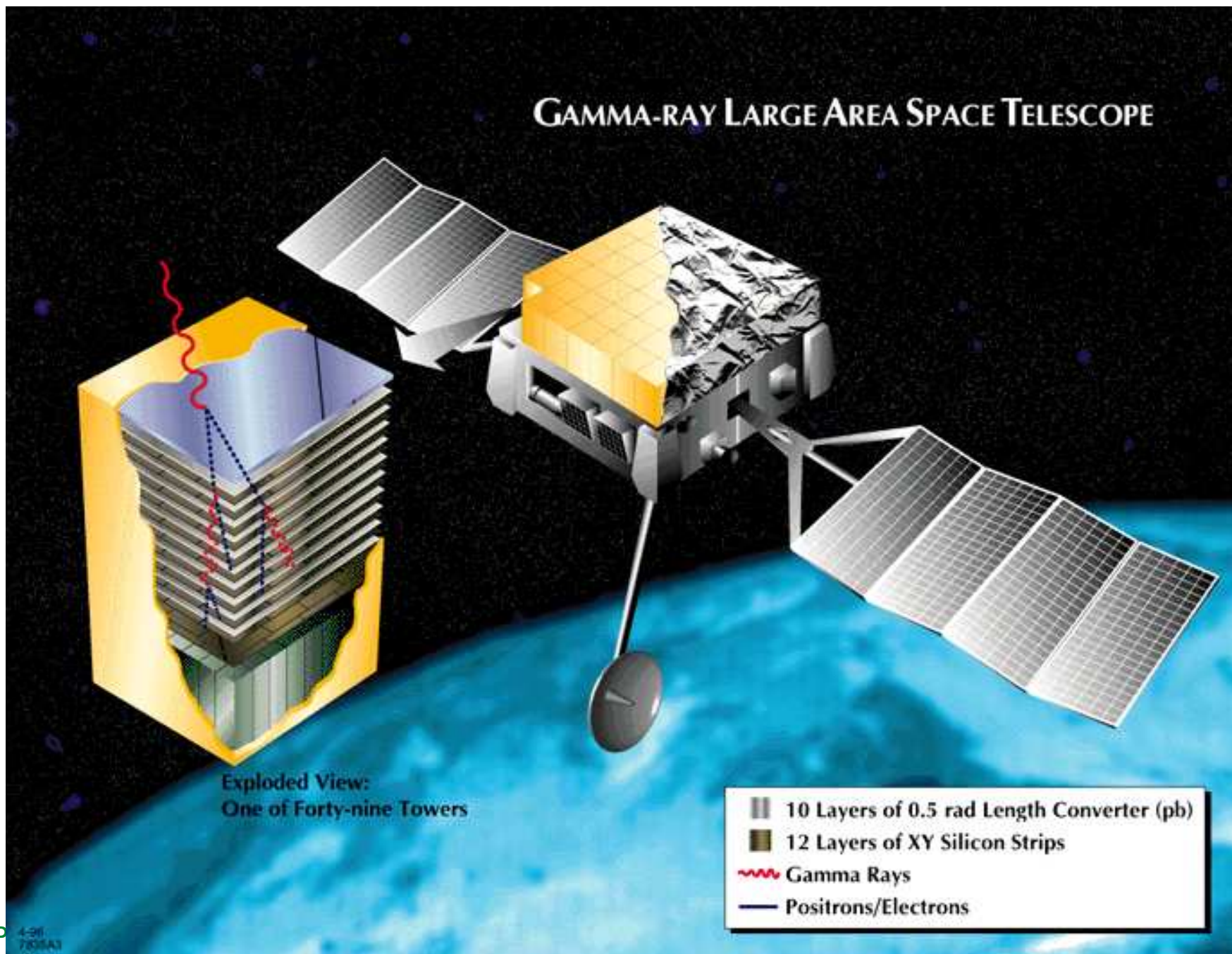






no antiproton discrepancy





Who knows?

