Resonant gamma-ray absorption by atomic nuclei

Photon-nuclei resonances at ~7 MeV, 20-30 MeV and ~325 MeV.

The Δ-resonance around 325 MeV is the most relevant one for LAT.
FWHM ~ 160 MeV for photon-protons
~ 300 MeV for photon-nuclei

Probe of column densities approx $10^{25} - 10^{27}$ cm⁻²

Ref: lyudin et.al. 2005, A&A 436, 763

S. Larsson GLAST AGN group VRVS meeting 31 Jan 2006

Iyudin et.al. found evidence for a Δ resonance absorption feature in EGRET data for couple of sources, in particular 3C279.



Spectral fit to COMPTEL (\Diamond) and EGRET (\Box) obser vation of 3C279 flare in Jan 1996. E = 203.5 ±3.5 MeV corresponding to E = 313 ± 10 MeV in the source rest frame (z=0.5536), consistent with Δ -resonance E of 325 MeV. From Iyudin et.al. (2005).

Potential LAT AGN studies:

- 1. Column densities in obscured sources.
- 2. Redshift determinations.
- 3. Search for baryonic dark matter around the galactic center.