Cosmic rays and supernova remnants

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Areas

- Full mapping of the pion bump
- Nonthermal bremsstrahlung
- Cosmic-ray reacceleration
- Nuclear de-excitation lines

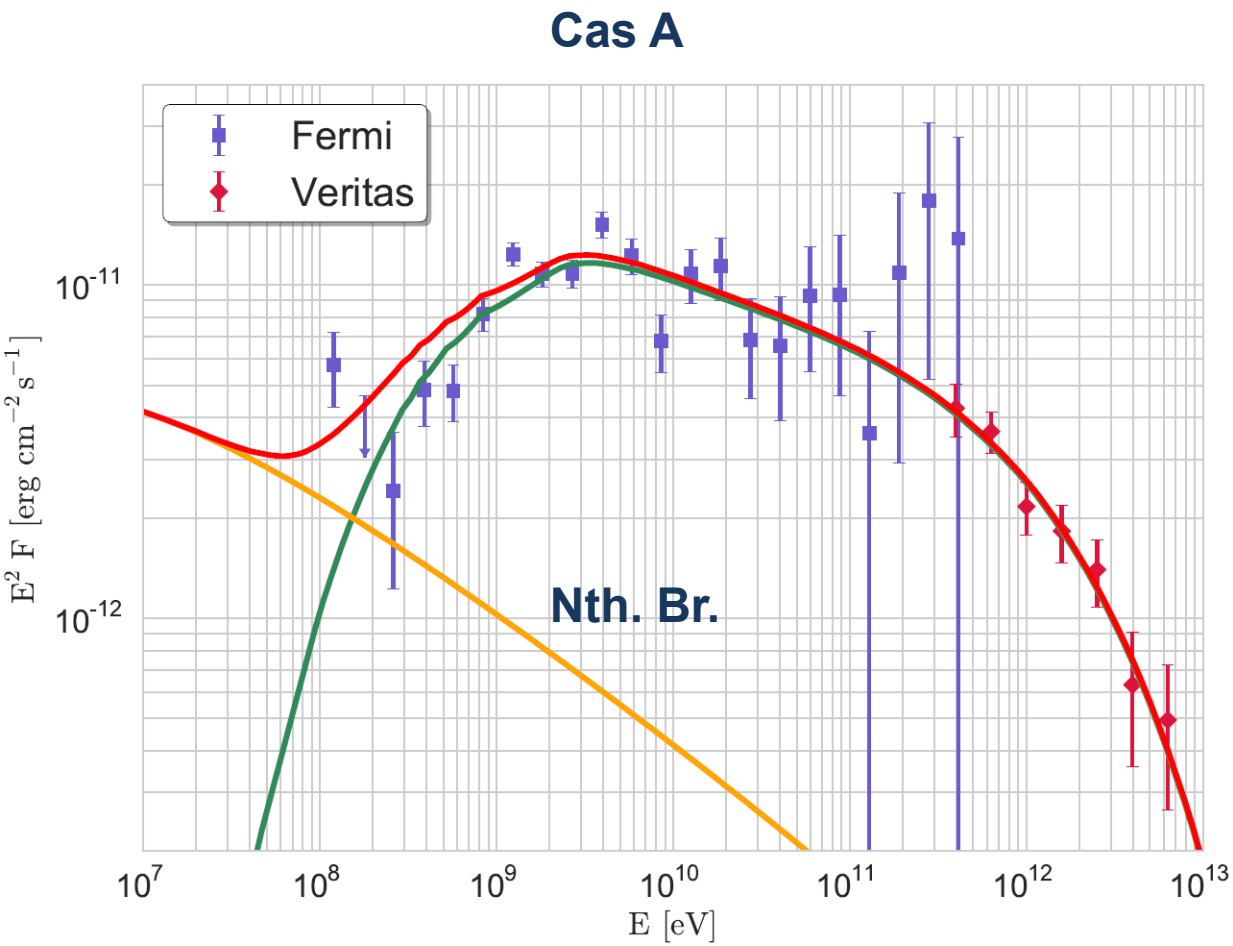
Nonthermal bremsstrahlung

Spectrum known from radio data

Flux measures magnetic field

Alleviates degeneracy leptonic/hadronic at VHE

Systematics in LAT data



CR reacceleration

Old interacting SNR:

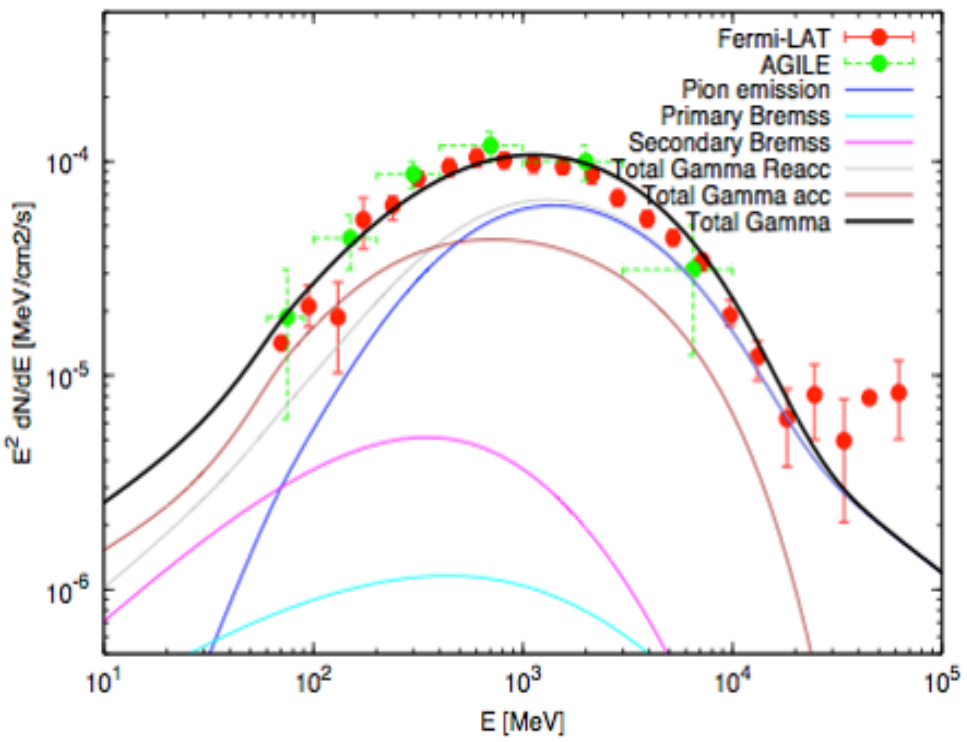
Acceleration or reacceleration of galactic CRs

Radiative shocks
→ hard spectra

Shape of pion bump young vs. old

Gamma rays from molecular clouds

W44



Major contribution from reacceleration would screw up secondary/primary analysis

Cardillo et al. 2016

De-excitation lines

Core-collapse SN: heavy composition

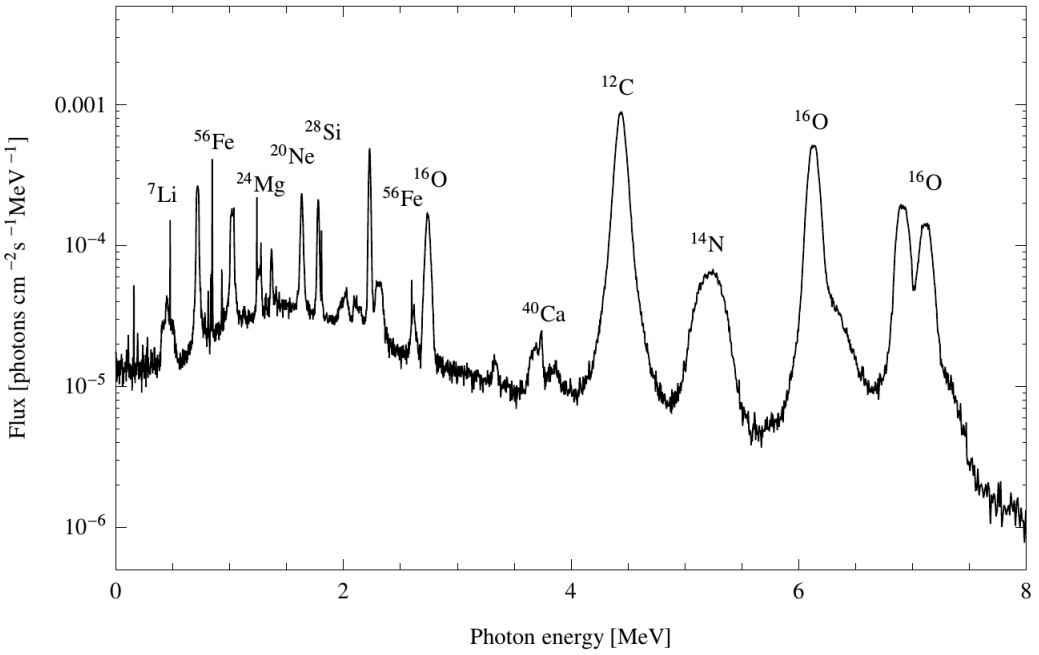
Nuclear lines permit abundance measurements

Broad lines from heavy CRs

Potential synergy with isotope measurements (^{60}Fe)

Which environment provides most cosmic rays?

Cas A



Taken from Summa et al. (2011)

Careful: Andrei suspects overestimate