

ORIGIN OF THE VERY HIGH ENERGY GAMMA-RAY EMISSION FROM THE CRAB NEBULA

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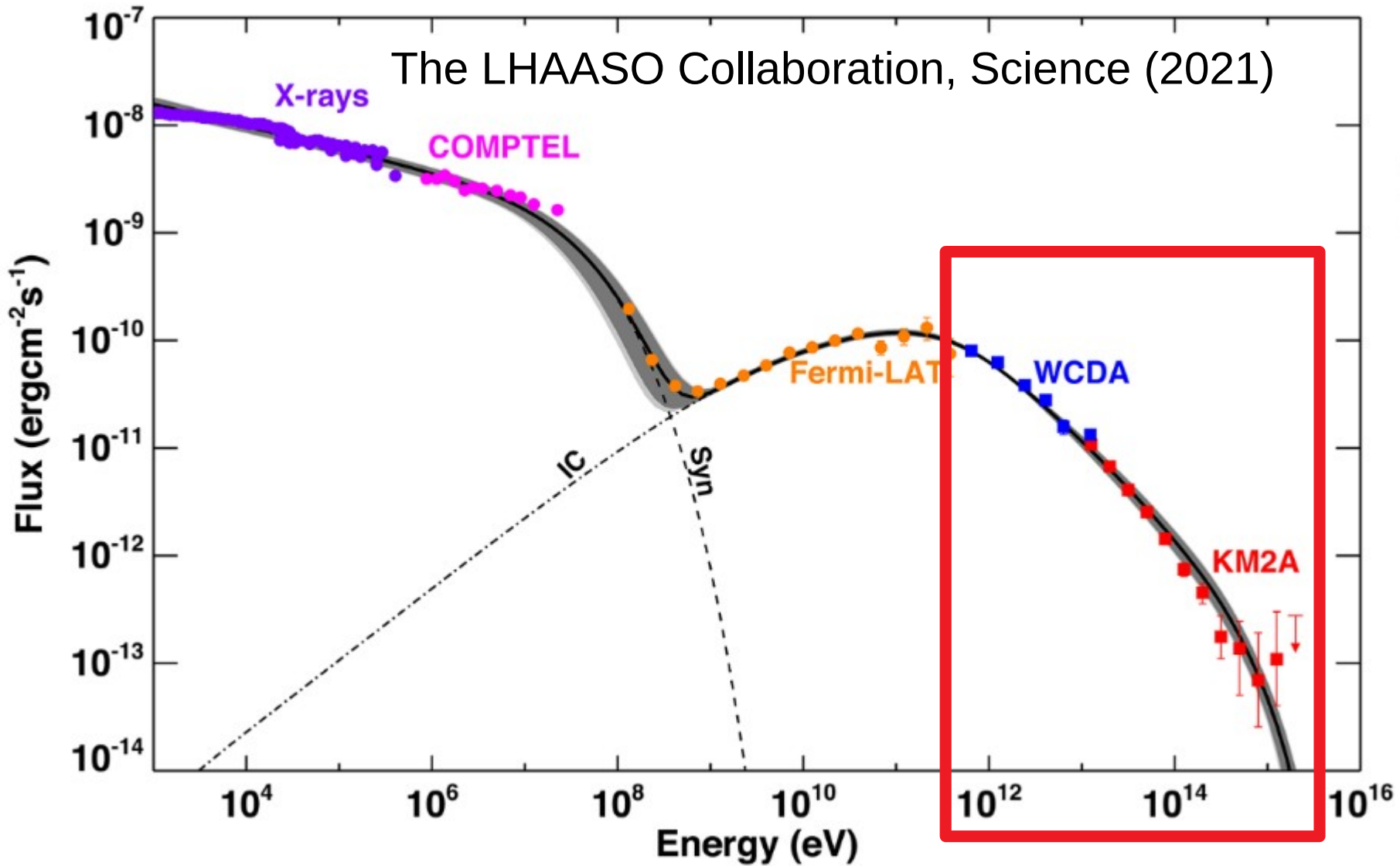
GG, Reville & Kirk, In Preparation (2022)

GG & Kirk, ApJ 863, 18 (2018) [arXiv:1804.05056]

Cerutti & GG, A&A 642, A123 (2020) [arXiv:2008.07253]

Cerutti & GG, A&A 656, A91 (2021) [arXiv:2111.04337]

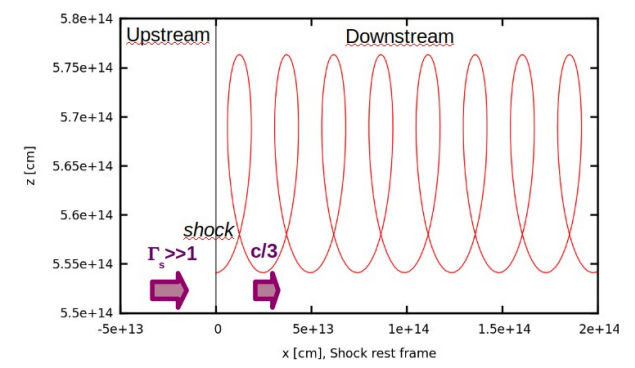
Crab Nebula observed by LHAASO



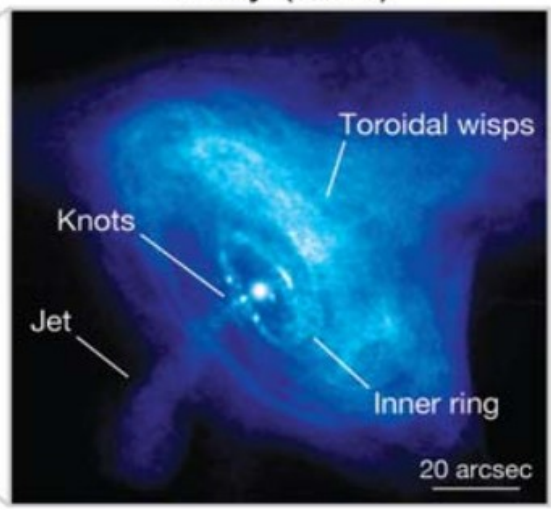
> 1 PeV !

1st order Fermi should NOT work at a PERPENDICULAR ultra-relativistic shock! →

New Solution: Giacinti & Kirk, ApJ 863, 18 (2018)



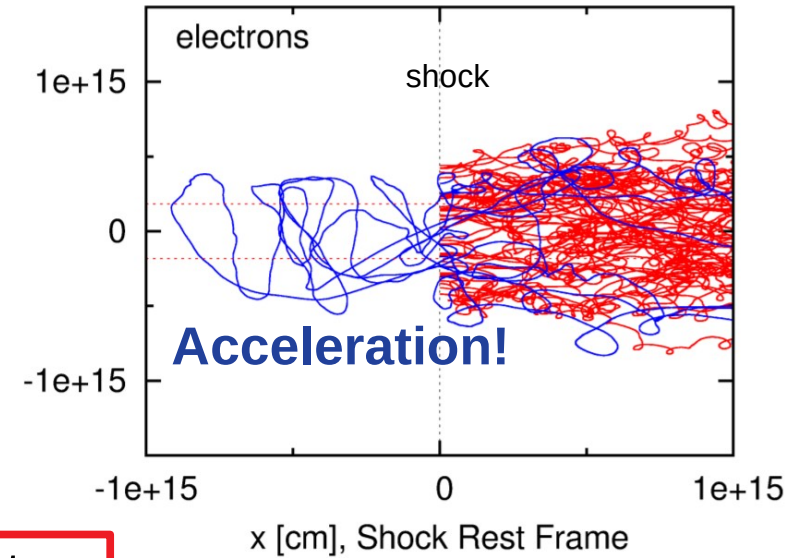
X-ray (CXC)



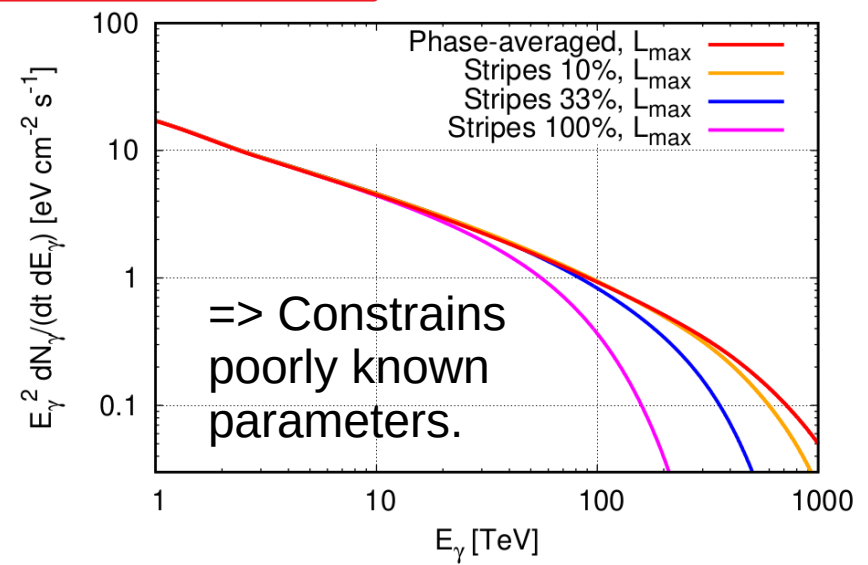
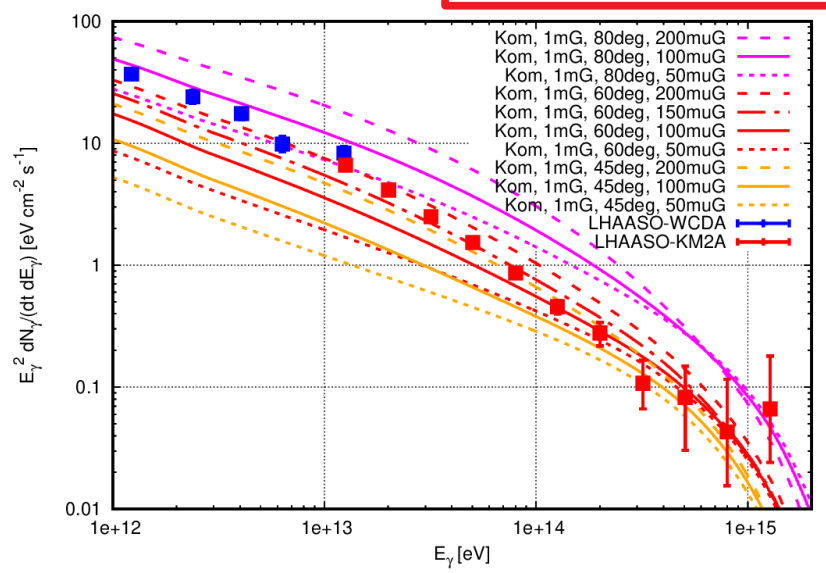
More realistic B-field geo.

1st numerical demonstration of e⁻ accel. to PeV at PW TS

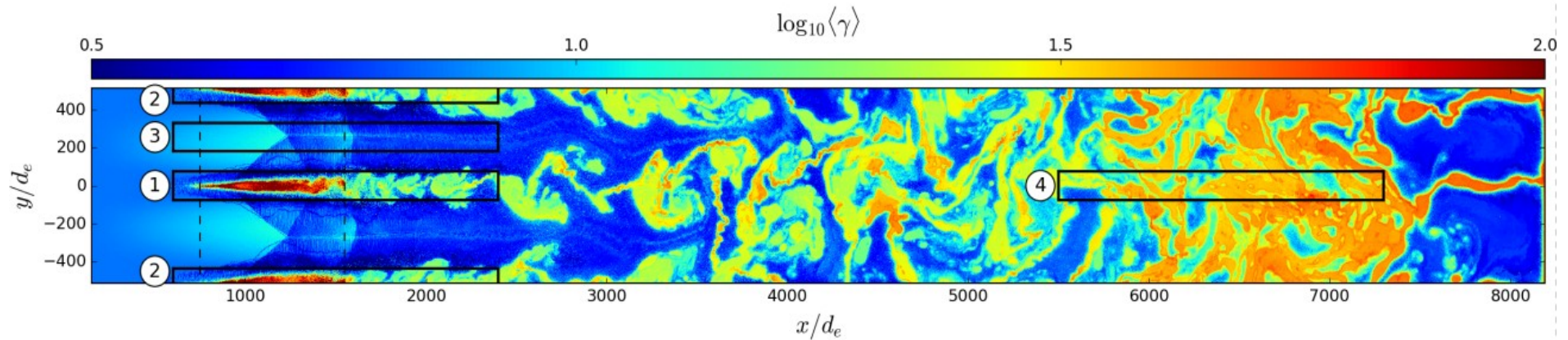
Test particles →



Comparison with LHAASO data :



Cerutti & Giacinti, A&A **642**, A123 (2020) : Particle-In-Cell (PIC) simulations:

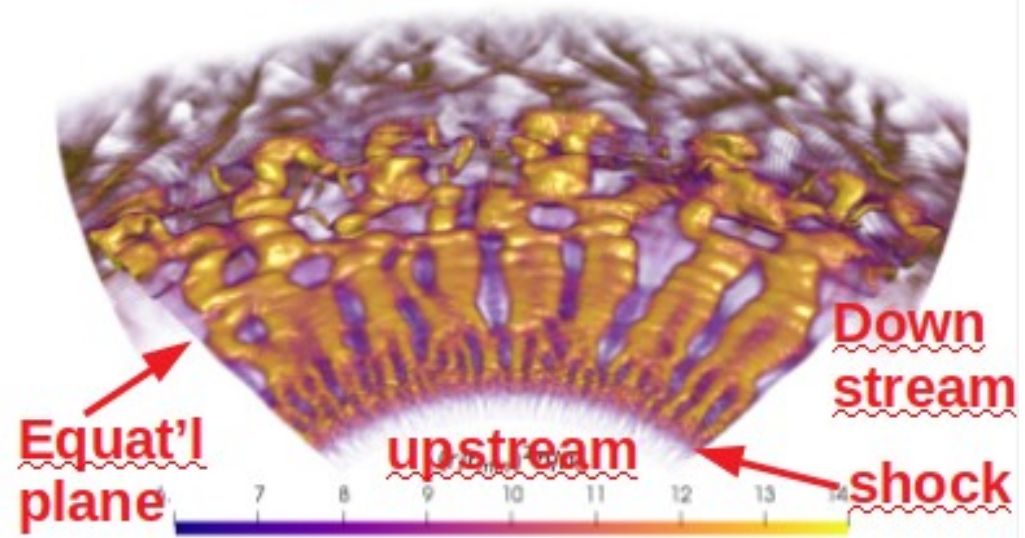


Previous studies: NO strong acceleration

Here: Very efficient e^+
or e^- acceleration !

Cerutti & Giacinti,
A&A **656**, A91 (2021):

Origin of the inner-ring knots? :
Dynamical chain of merging
plasmoids \rightarrow Giant plasmoids.



3D rendering of the final state of the
plasma density for $\sigma=4.5$