



A new model predicting gamma-rays, and neutrino signals from X-ray binary jets

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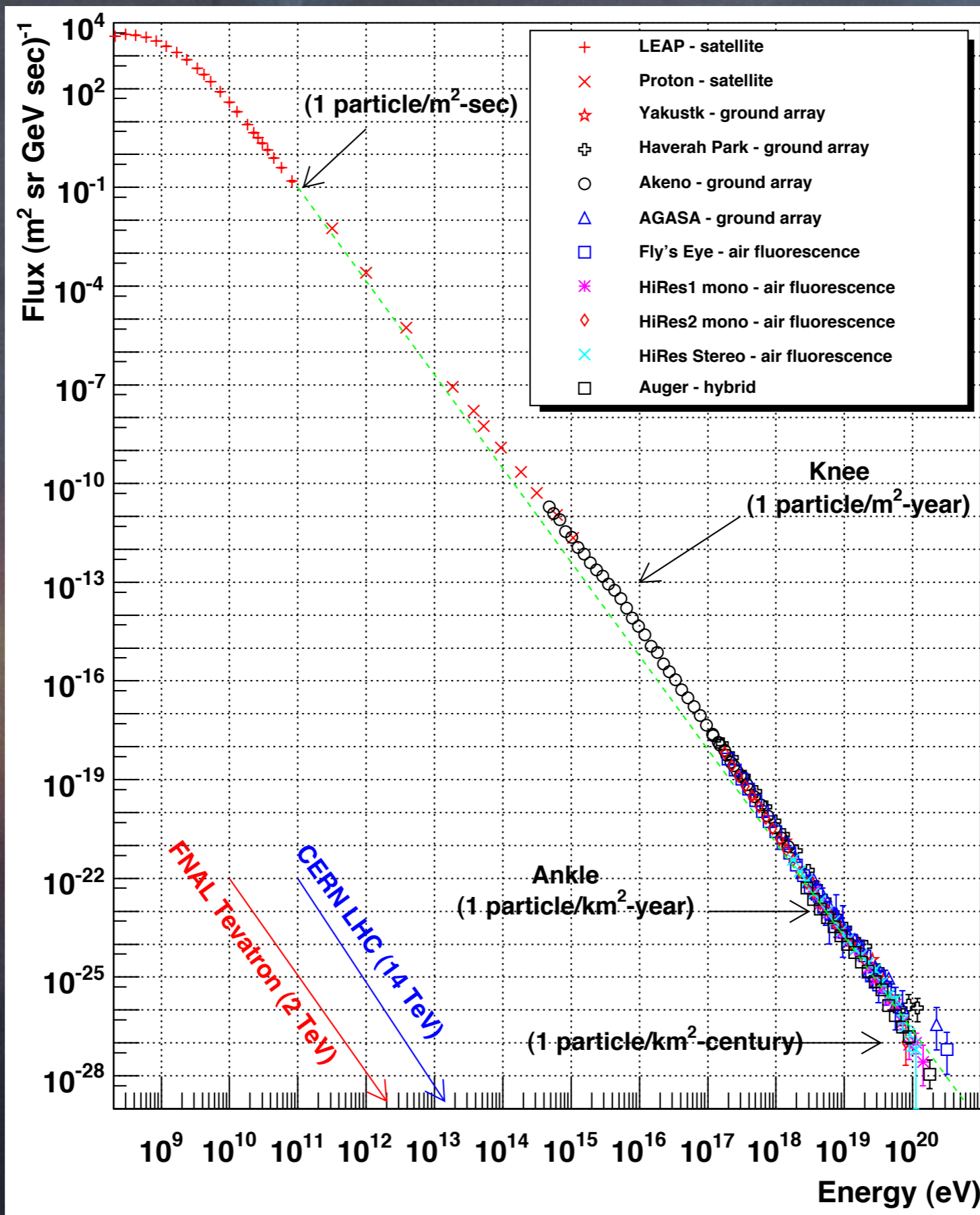
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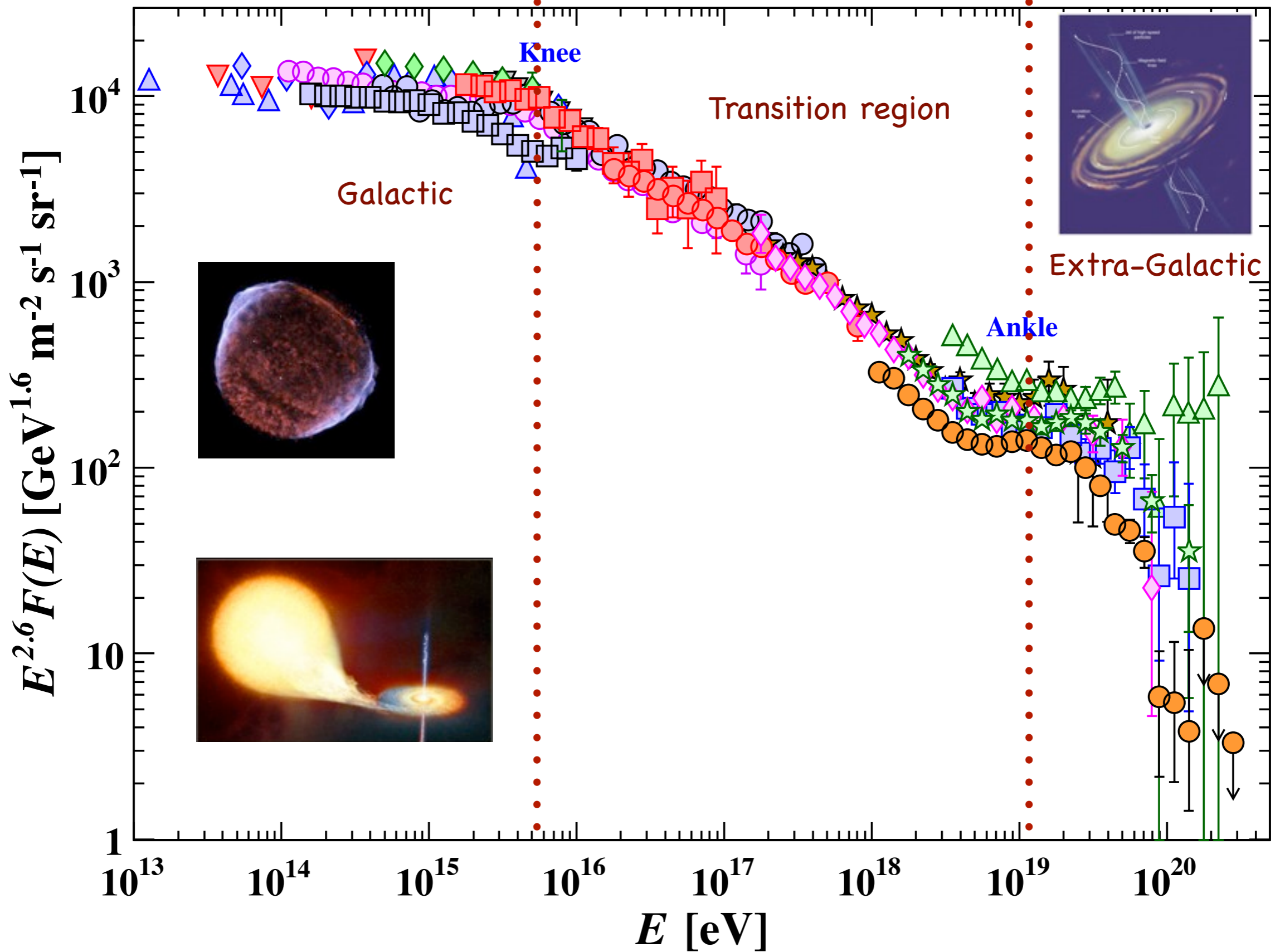
LIO neutrino 2012 – Lyon – October 22-24, 2012

Cosmic Ray Spectrum



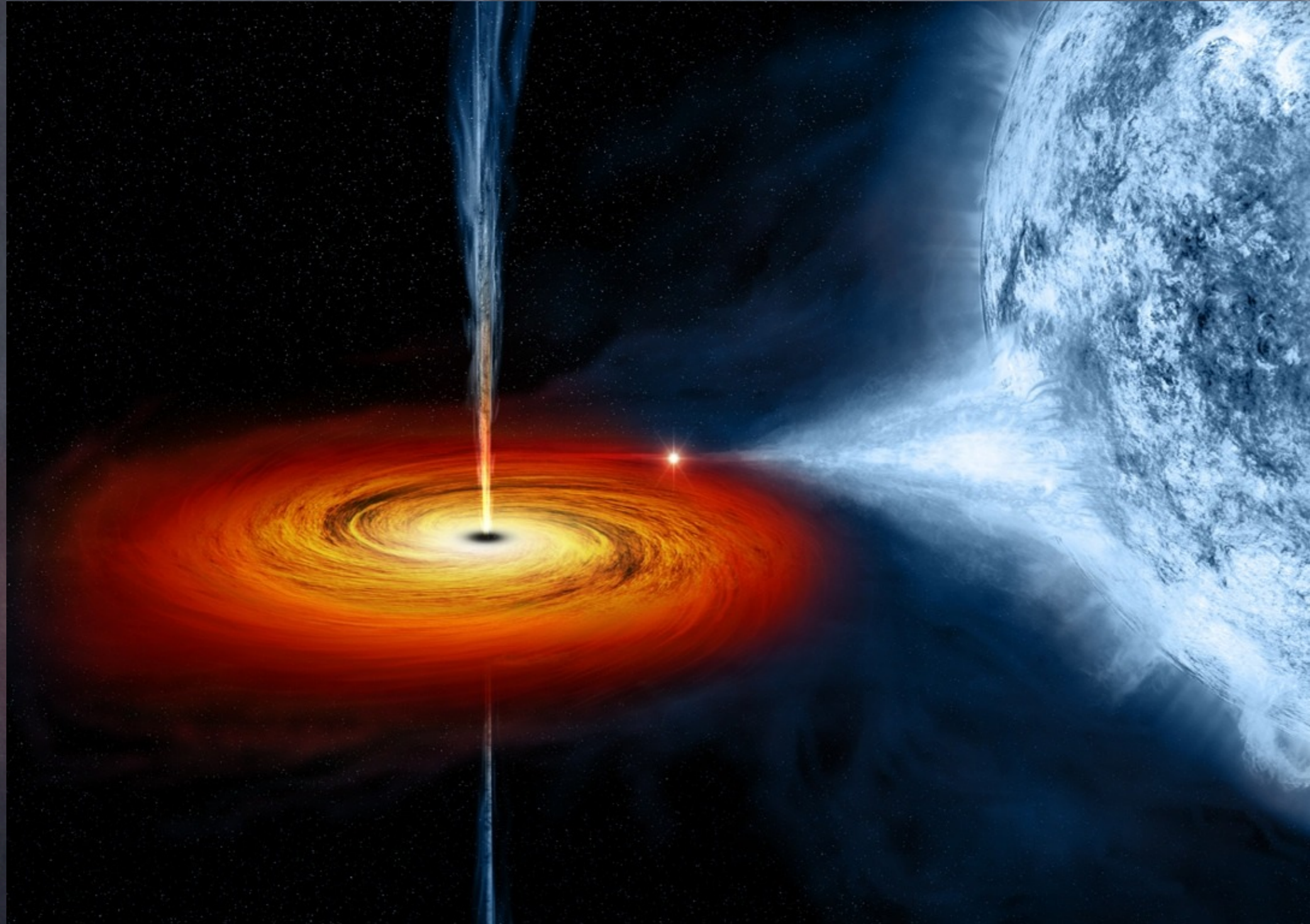
Credit: W. Hanlon

Cosmic Ray Spectrum



Credit: Particle Data Group (2011)

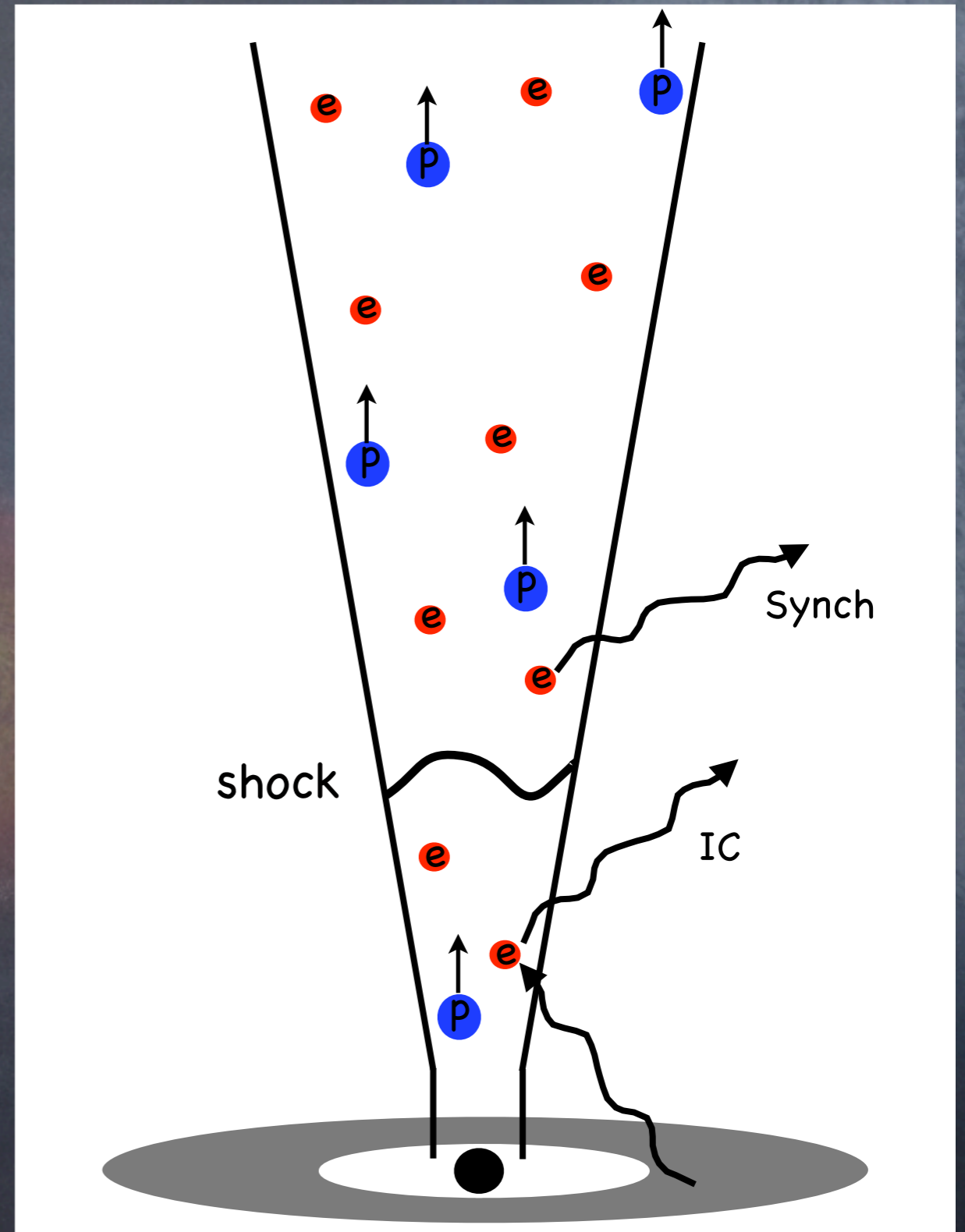
Jets, acceleration engines



Credit: Chandra press office

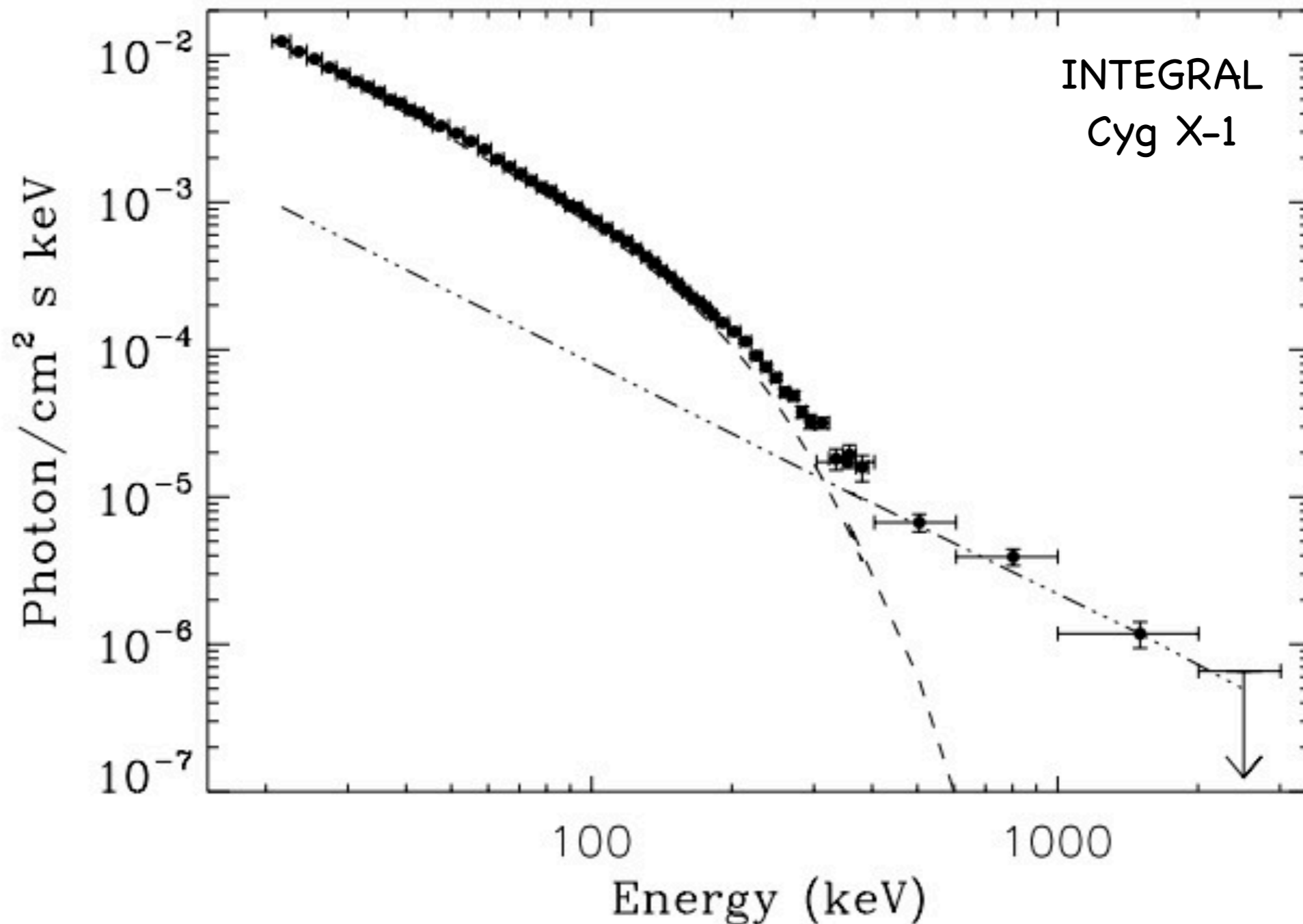
Leptonic jet model

- Radiations from electrons
- Models emission from radio to X-ray
- Protons as kinetic carriers



New developments

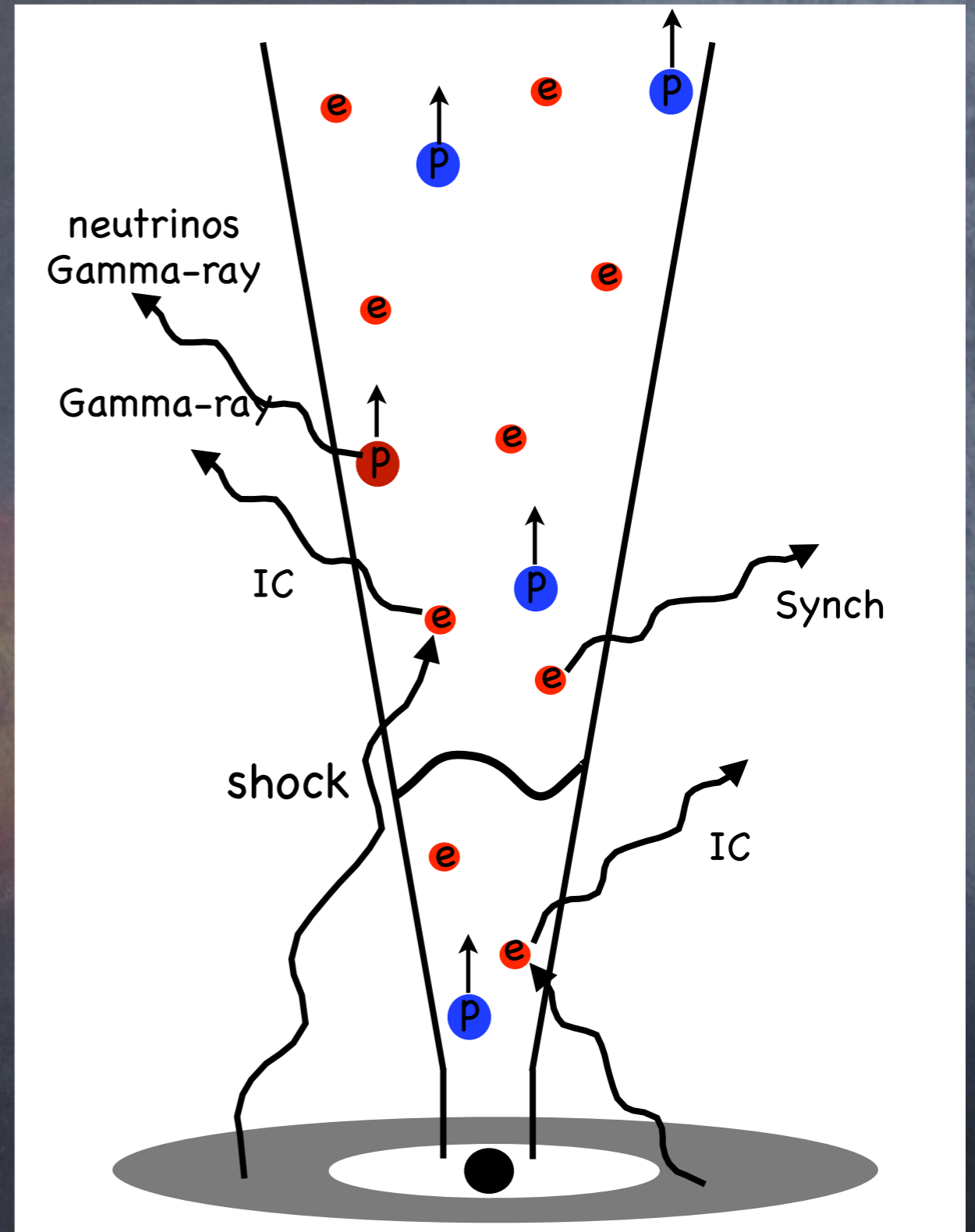
Gamma-ray window



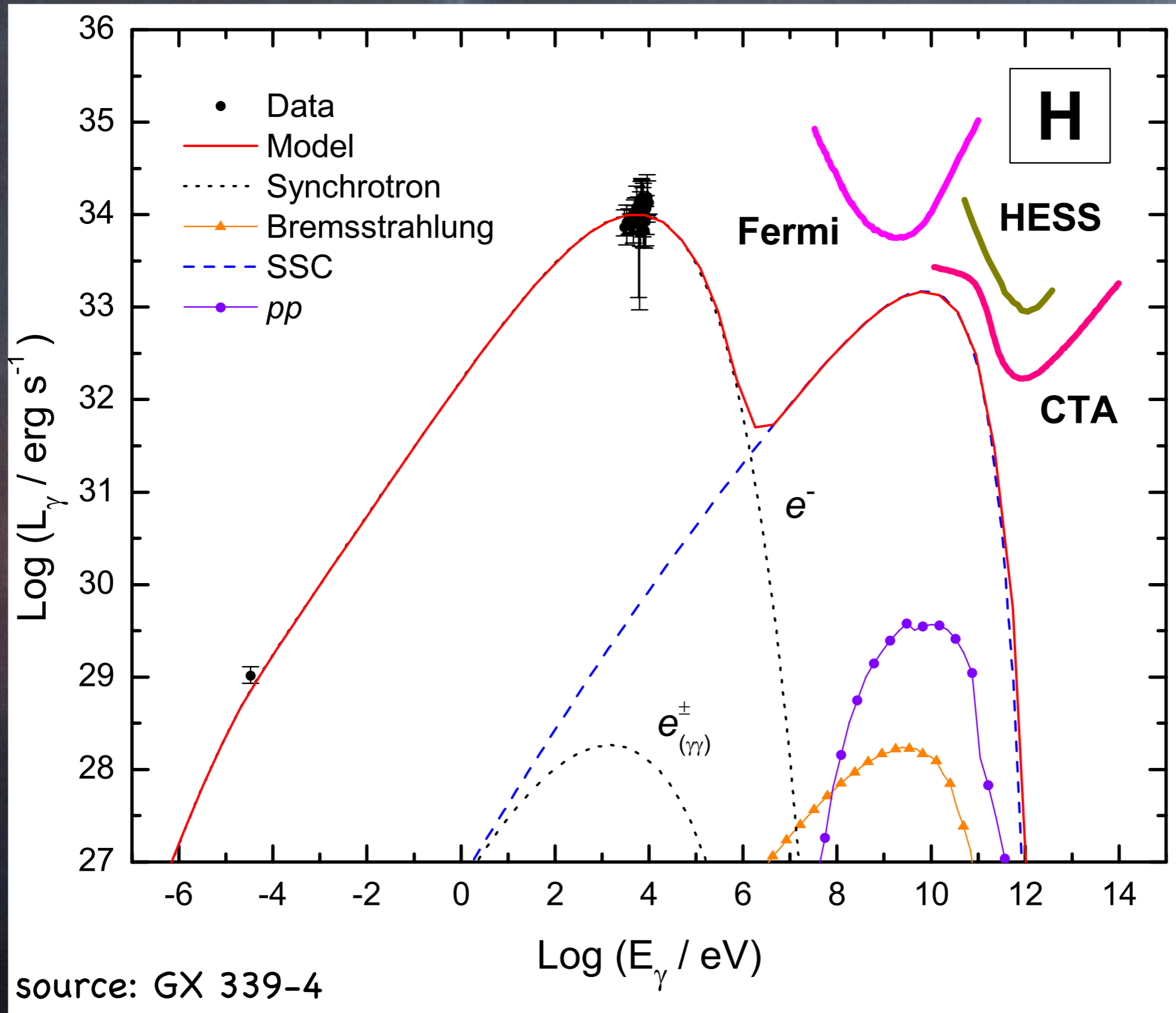
Credit: Laurent et al. (2011)

Lepto-hadronic jet model

- Protons get accelerated
- Radiation via proton-proton and proton-photon interactions
- Gamma-ray and neutrino signals

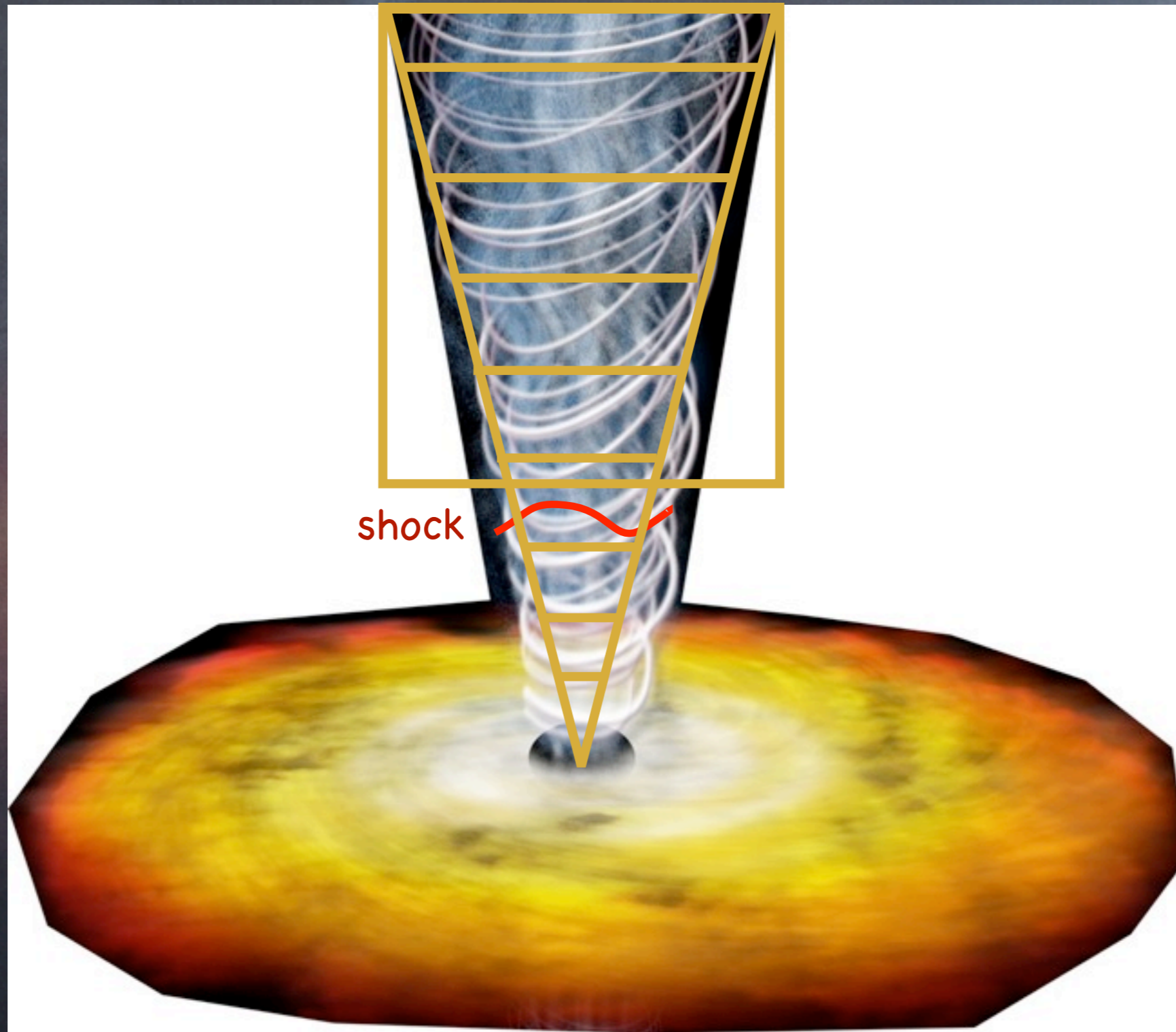


Lepto-hadronic jet model

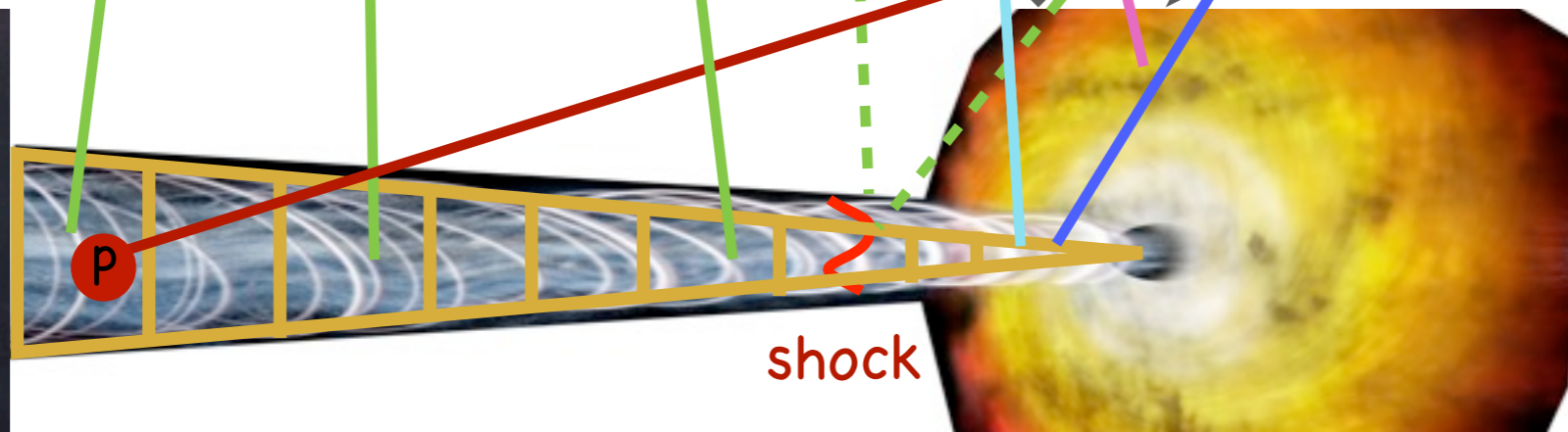
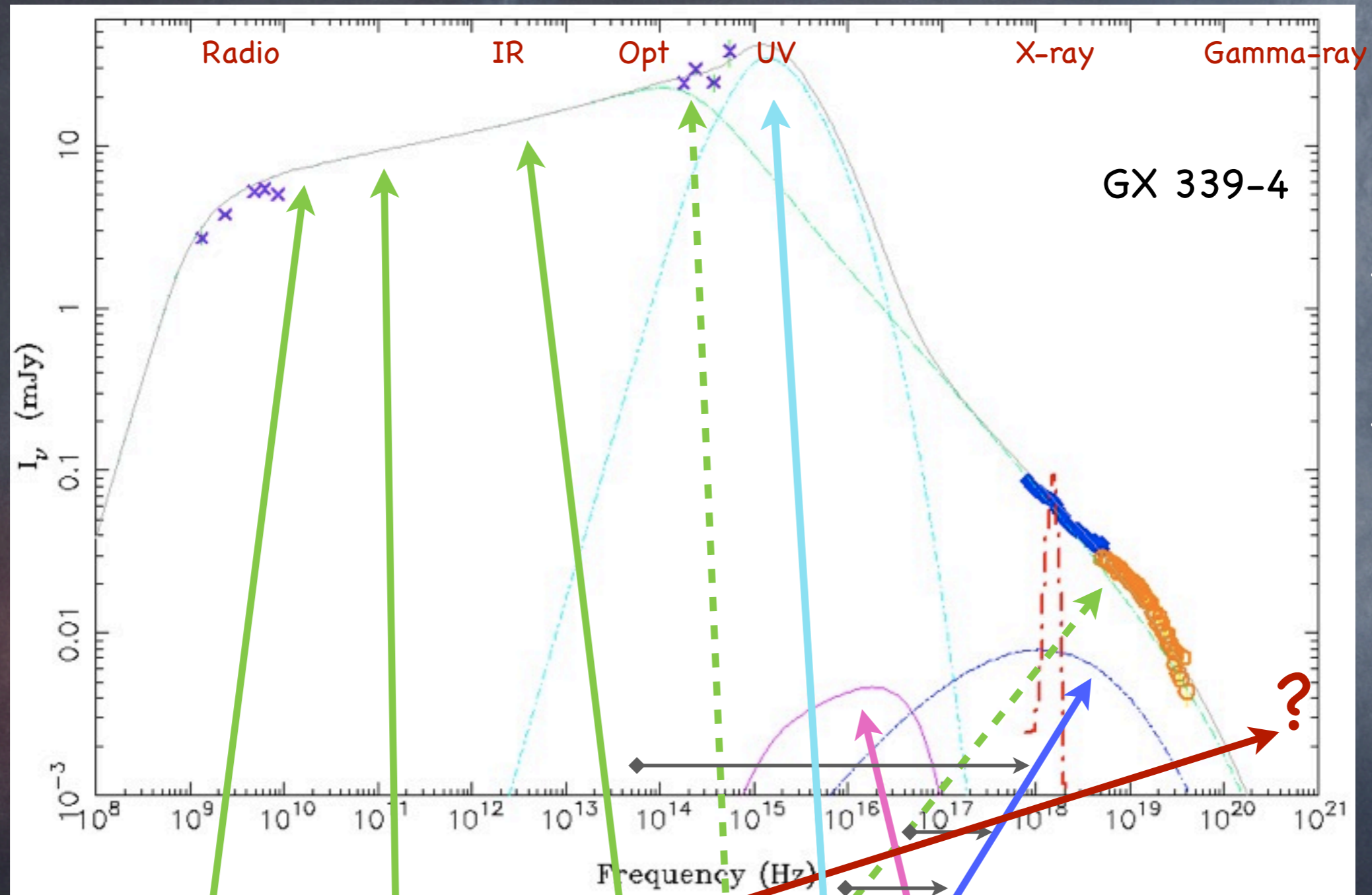


Credit: Vila & Romero (2010)

Lepto-hadronic jet model



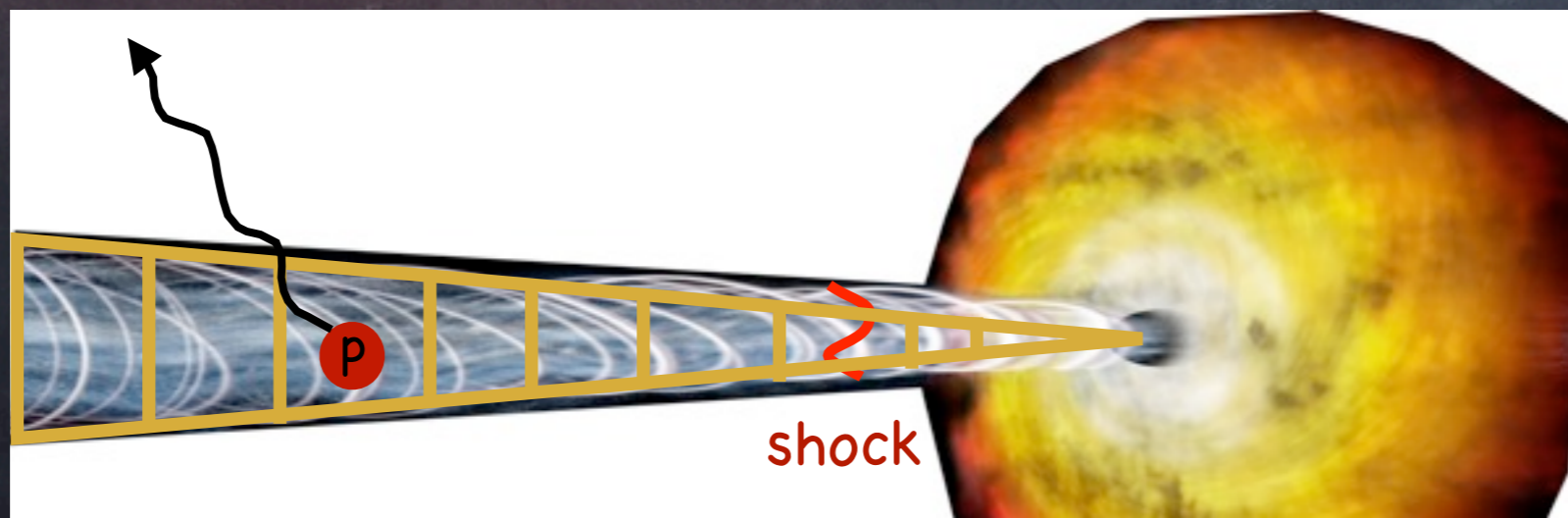
Lepto-hadronic jet model



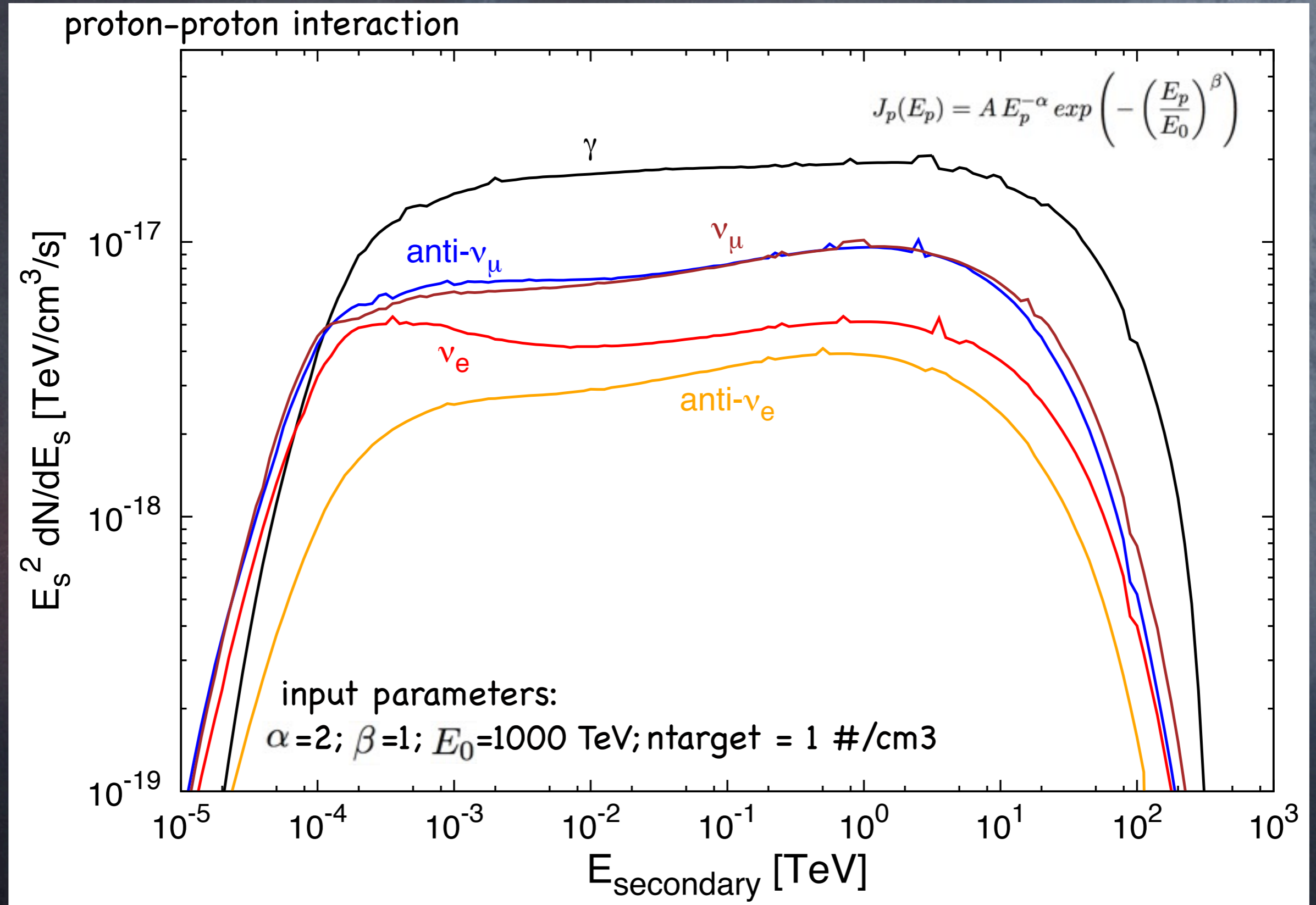
Credit: Drappeau et al. (in prep.)

Hadronic emission

- proton-proton interaction using Karlsson & Kamae (2008) parametrization and Kelner et al.(2006)
- proton-photon interaction using Kelner & Aharonian (2008)

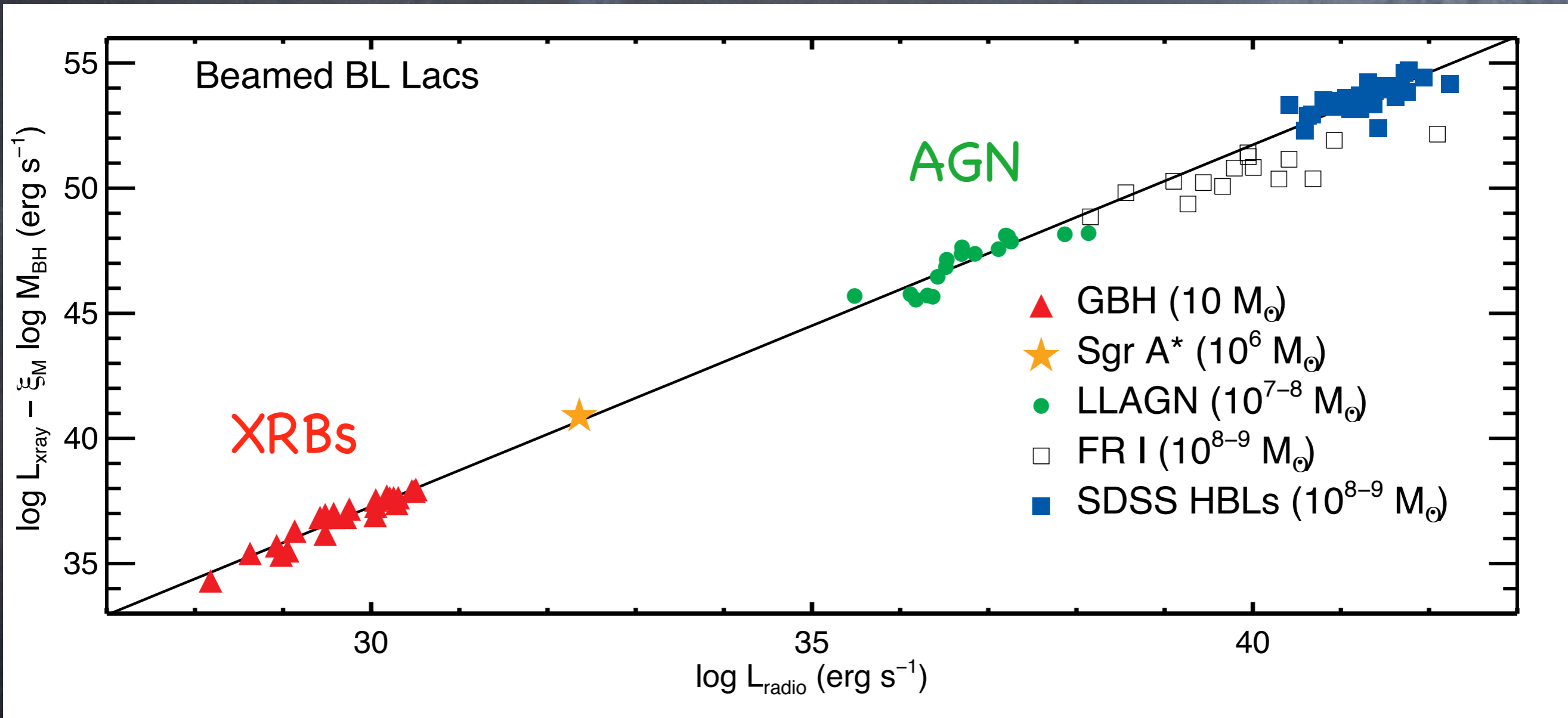


Secondaries product spectra



Credit: Drappeau et al. (in prep.)

Fundamental plane of black hole accretion



References:

Merloni et al. (2003)

Falcke et al. (2004)

Credit: Plotkin et al. (2011)

Jet model and neutrinos

Help to...

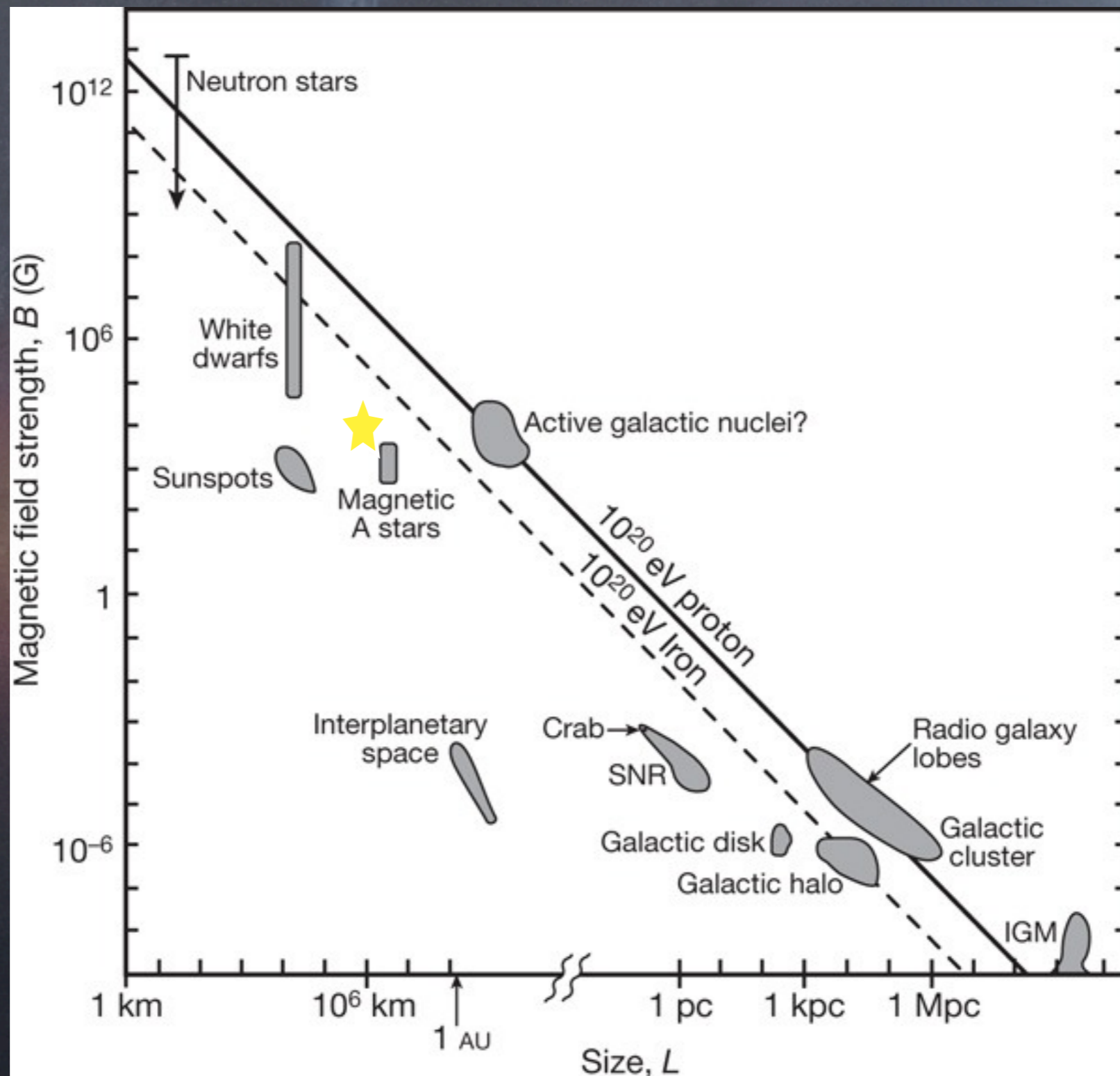
- ...choose promising sources
- ...study cycling flaring events of gamma-rays and neutrinos
- ...better constrain gamma-ray and neutrino background signal from astrophysical sources in the Dark Matter annihilation

Conclusions

- Multi-zone lepto-hadronic astrophysical jet model
- Multiwavelength and multi-messenger studies of X-ray binaries and Active Galactic Nuclei
- Gamma-ray & neutrino signal predictions
- Cycling flaring events of neutrinos/gamma-ray
- Dark Matter annihilation

Extra slides

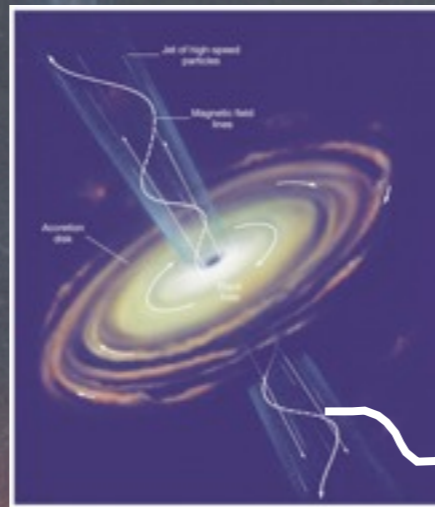
Hillas diagram



Credit: Bauleo & Martino (2009)

Extra slides

Dark Matter Annihilation



Gamma-ray and neutrino signal from astrophysical background sources

