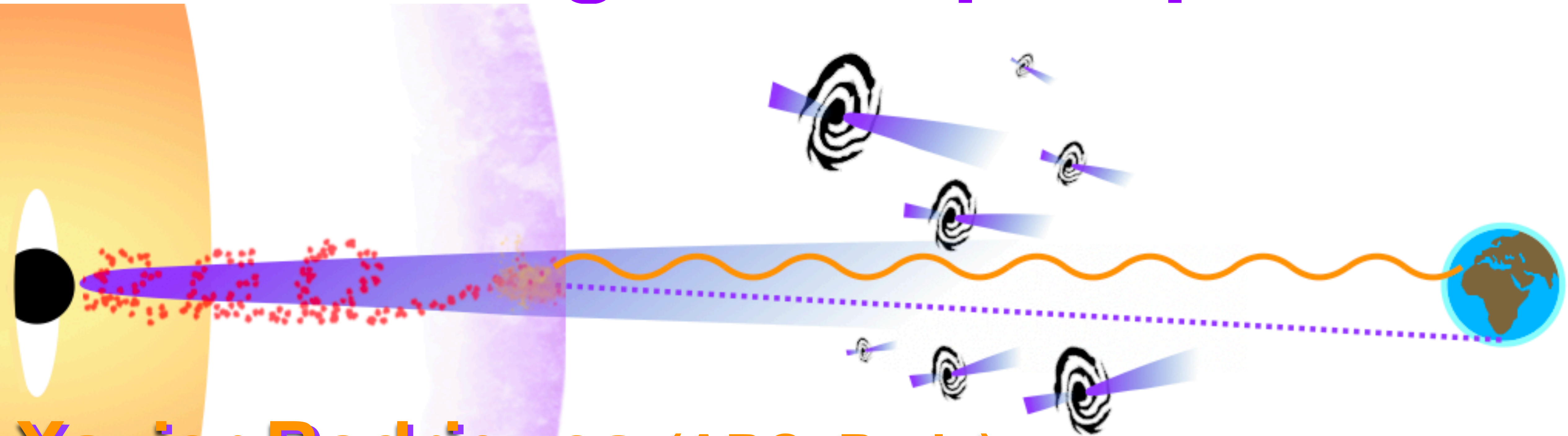
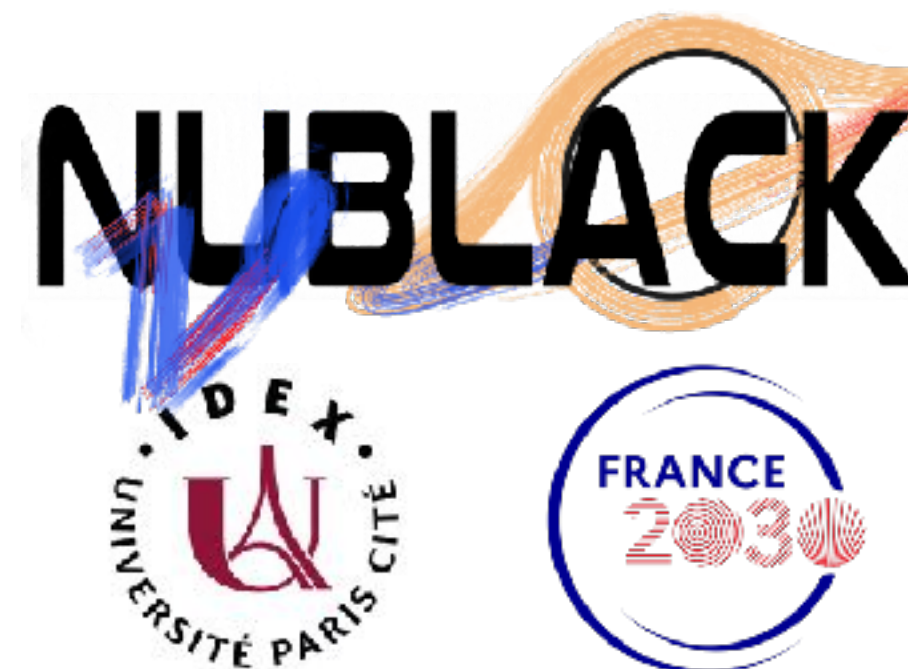


AGN modeling: challenges and prospects

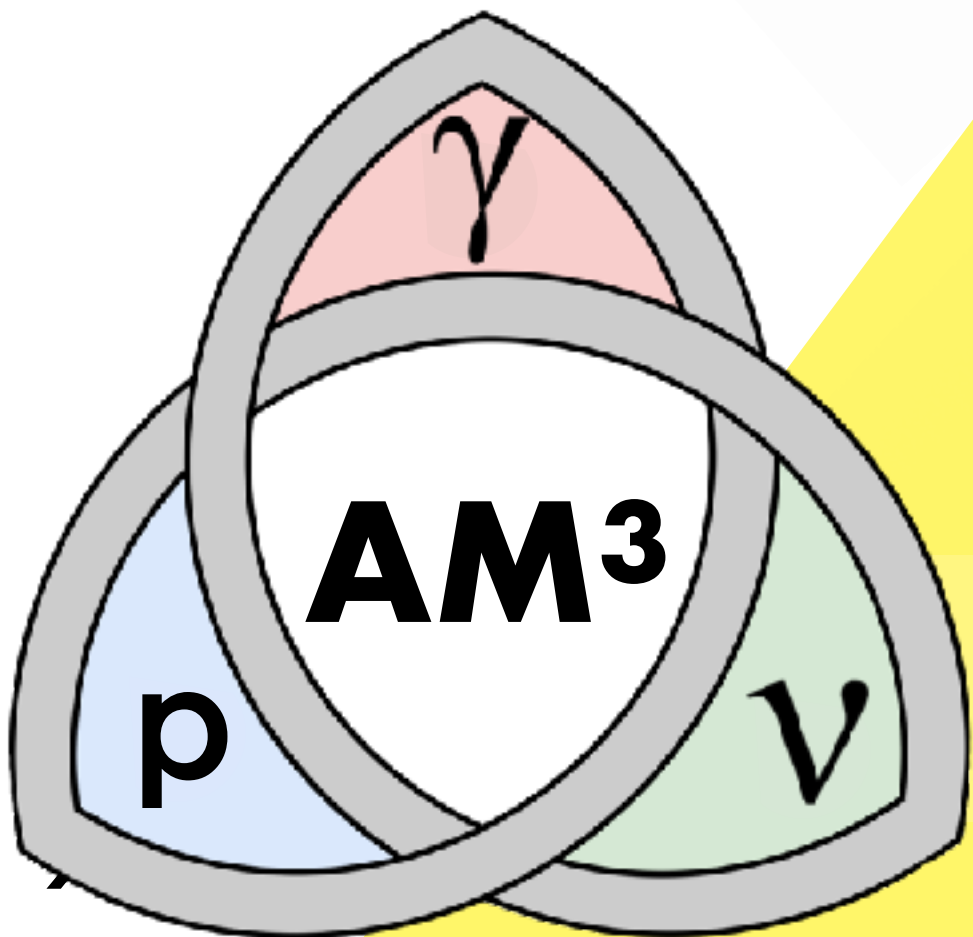
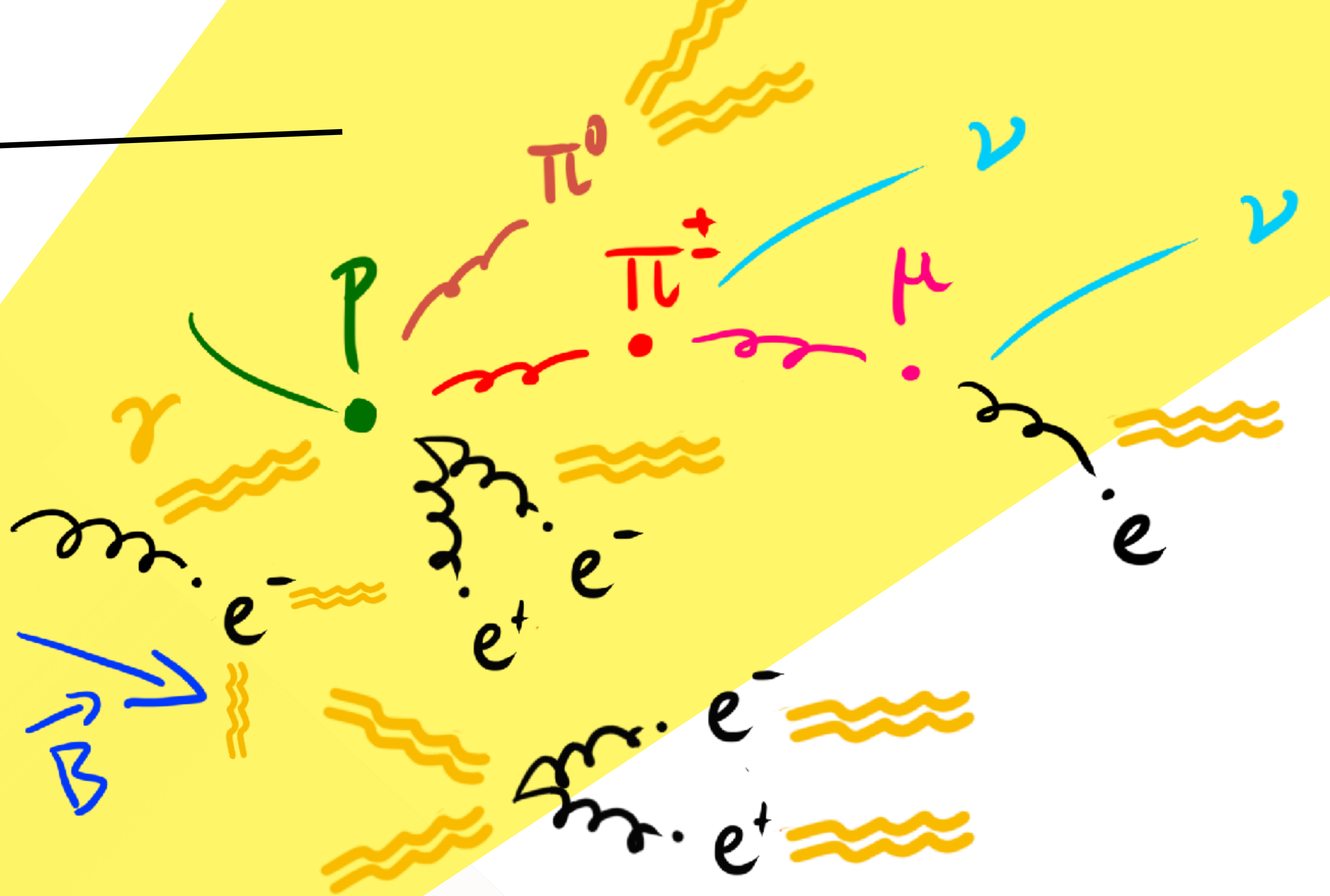
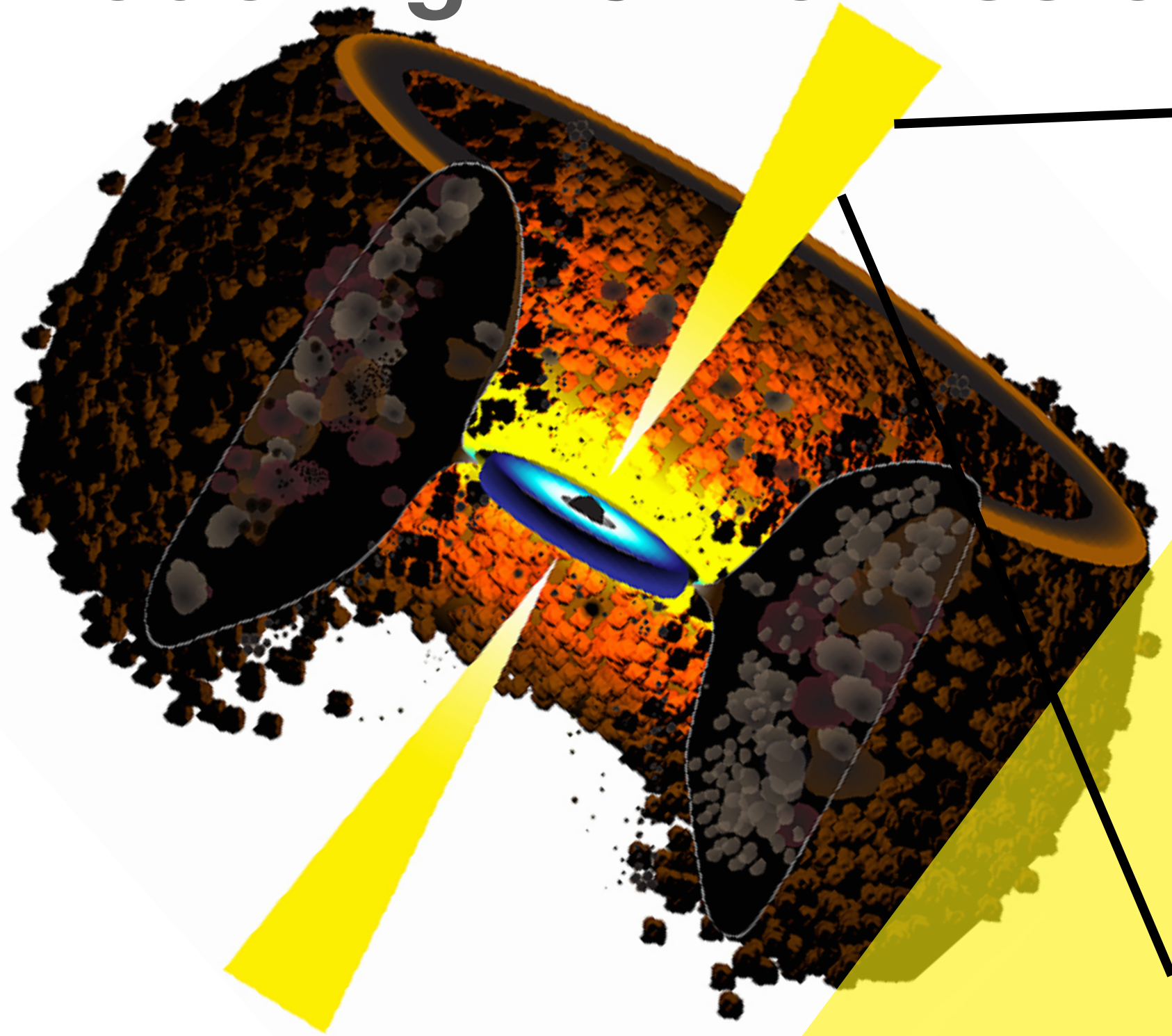


Xavier Rodriguez (APC, Paris)

“AGN as Dark Sector Laboratories” week
IFPU, SISSA, Trieste, June 2026

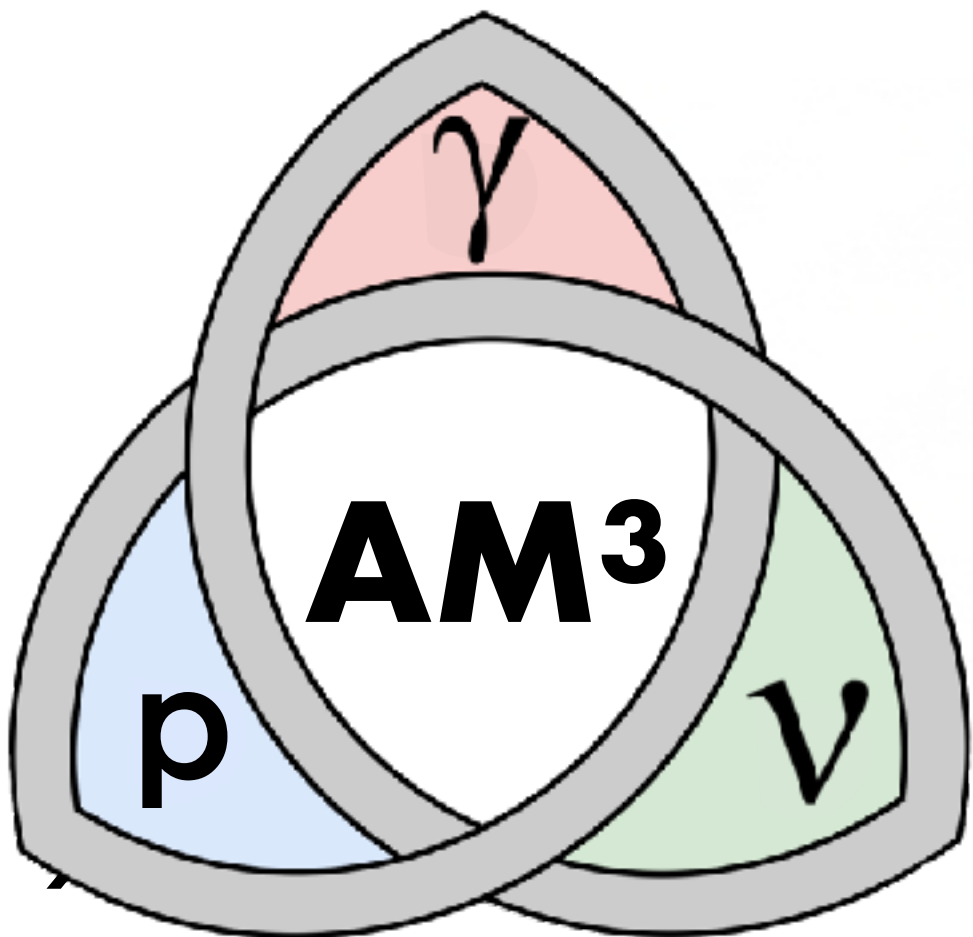
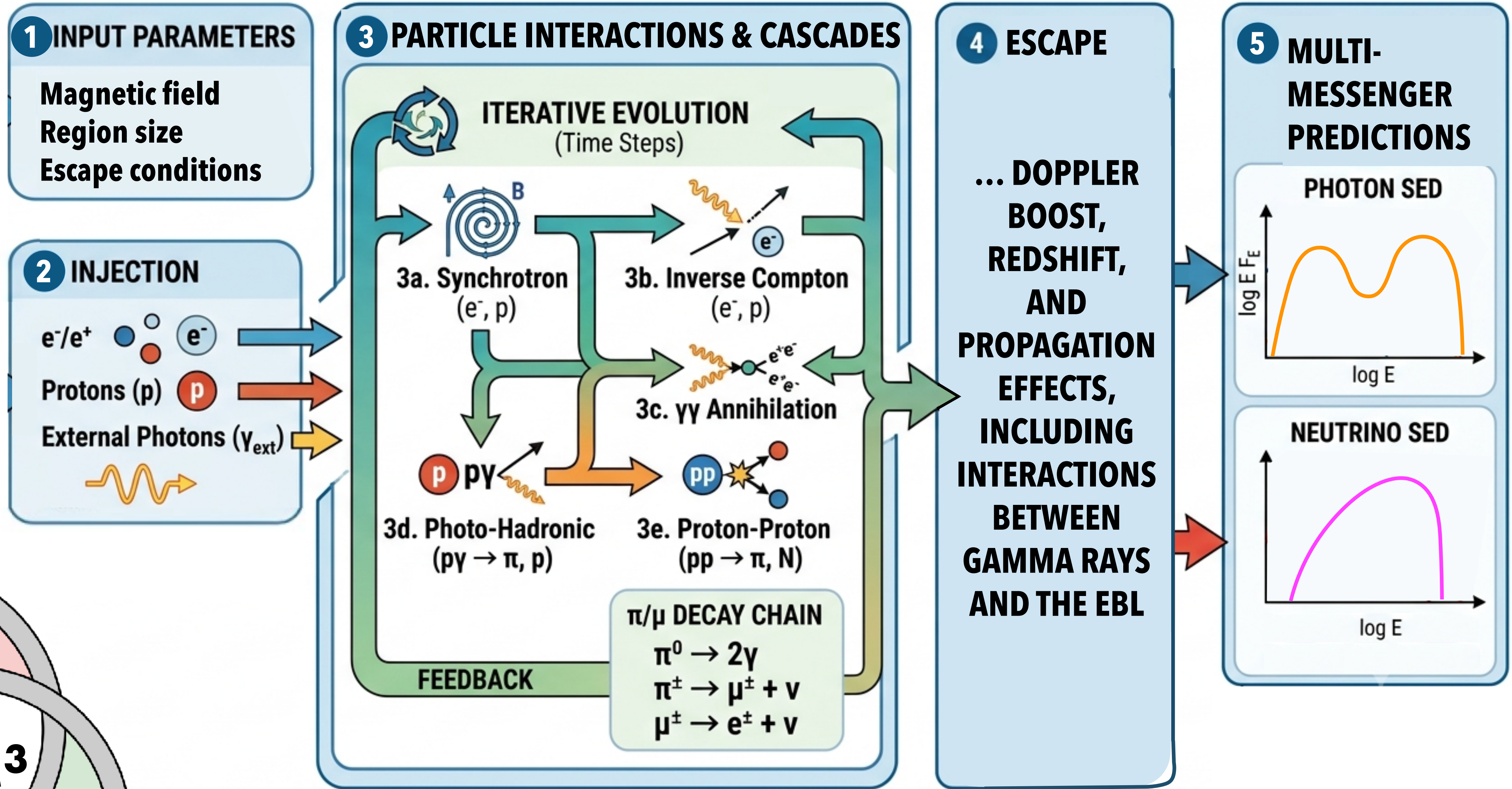


Modeling AGN emission

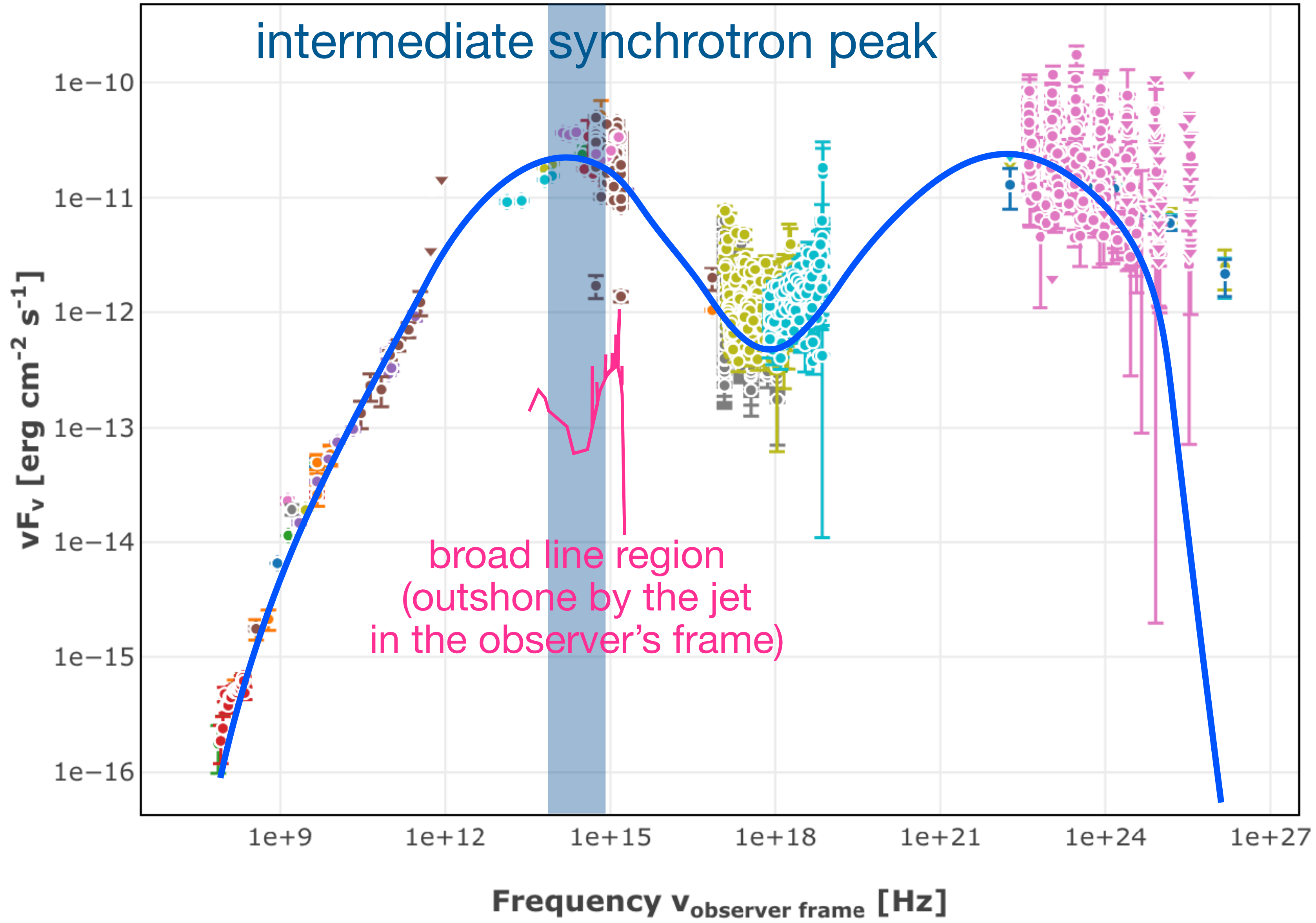


am3.readthedocs.io

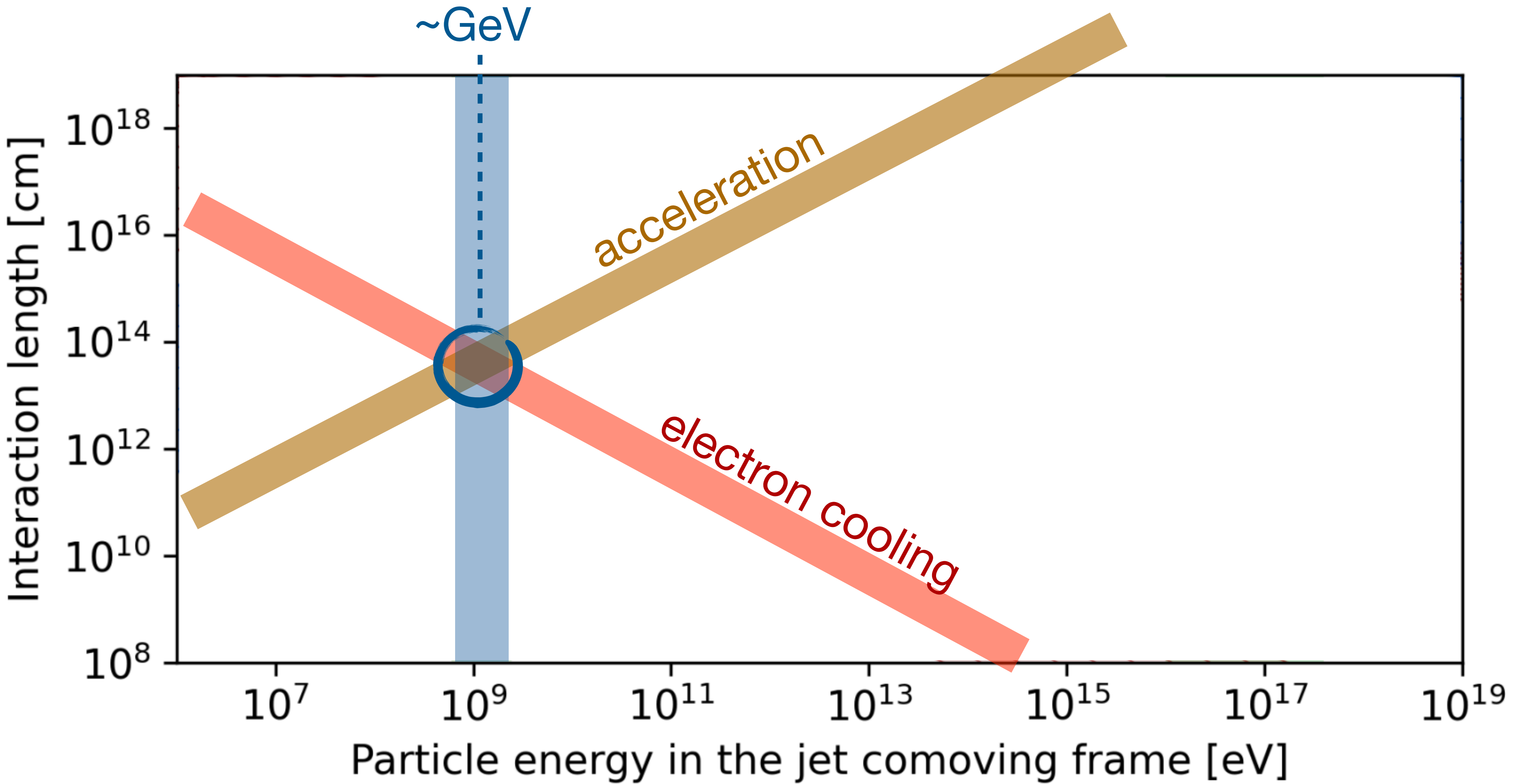
Modeling AGN emission



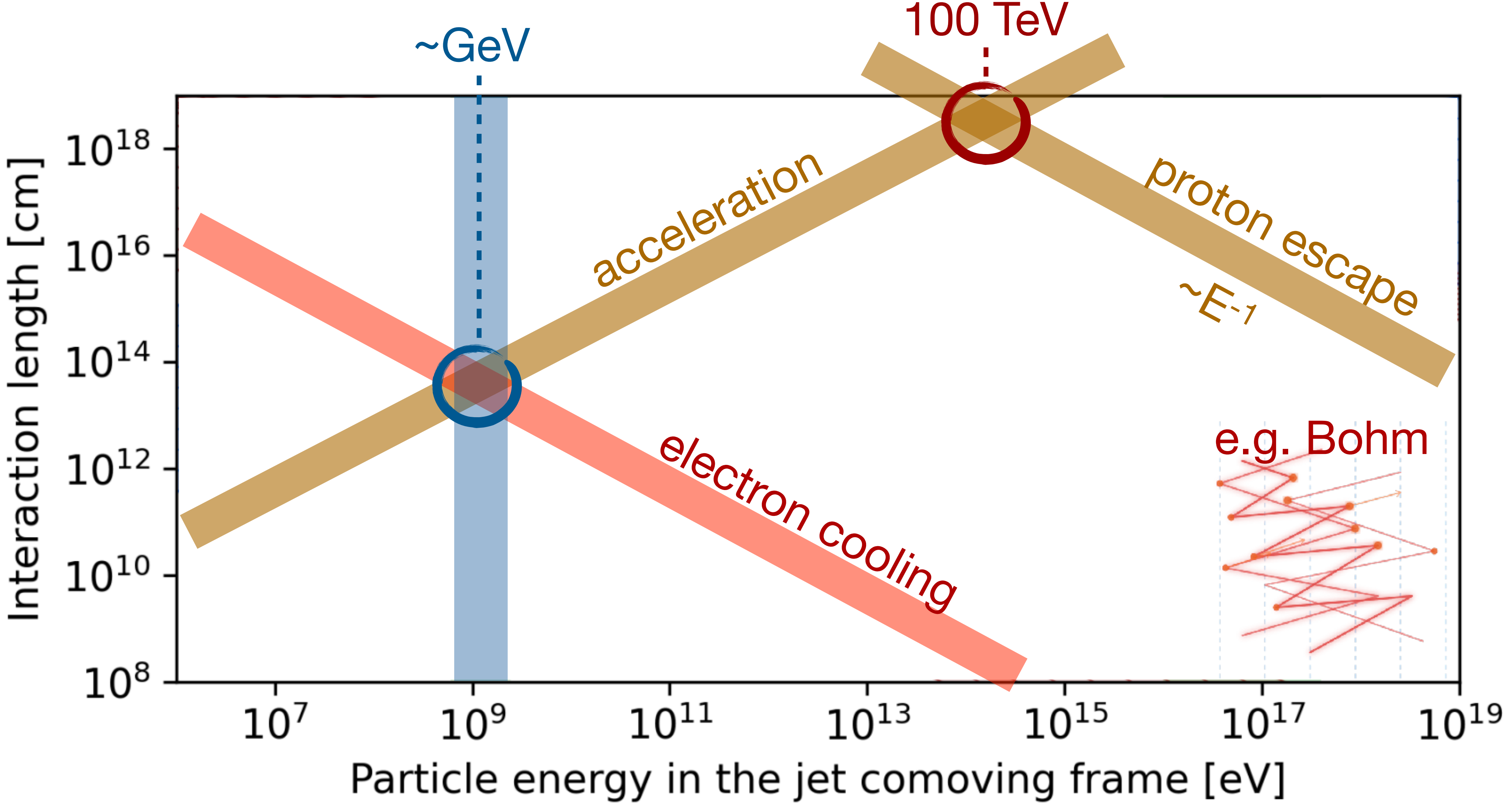
TXS 0506+056, a decade on: what do we know?



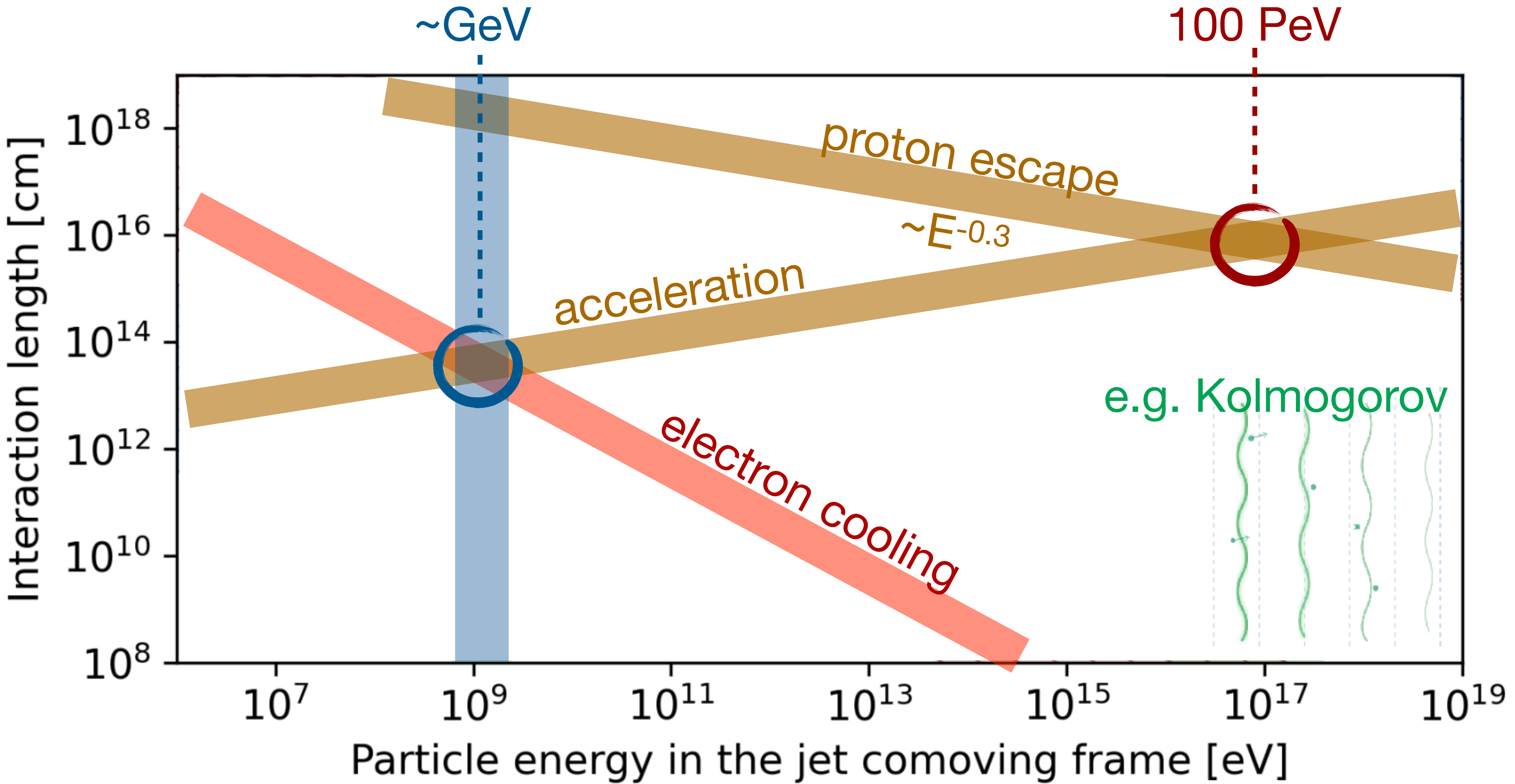
TXS 0506+056, a decade on: what do we know?

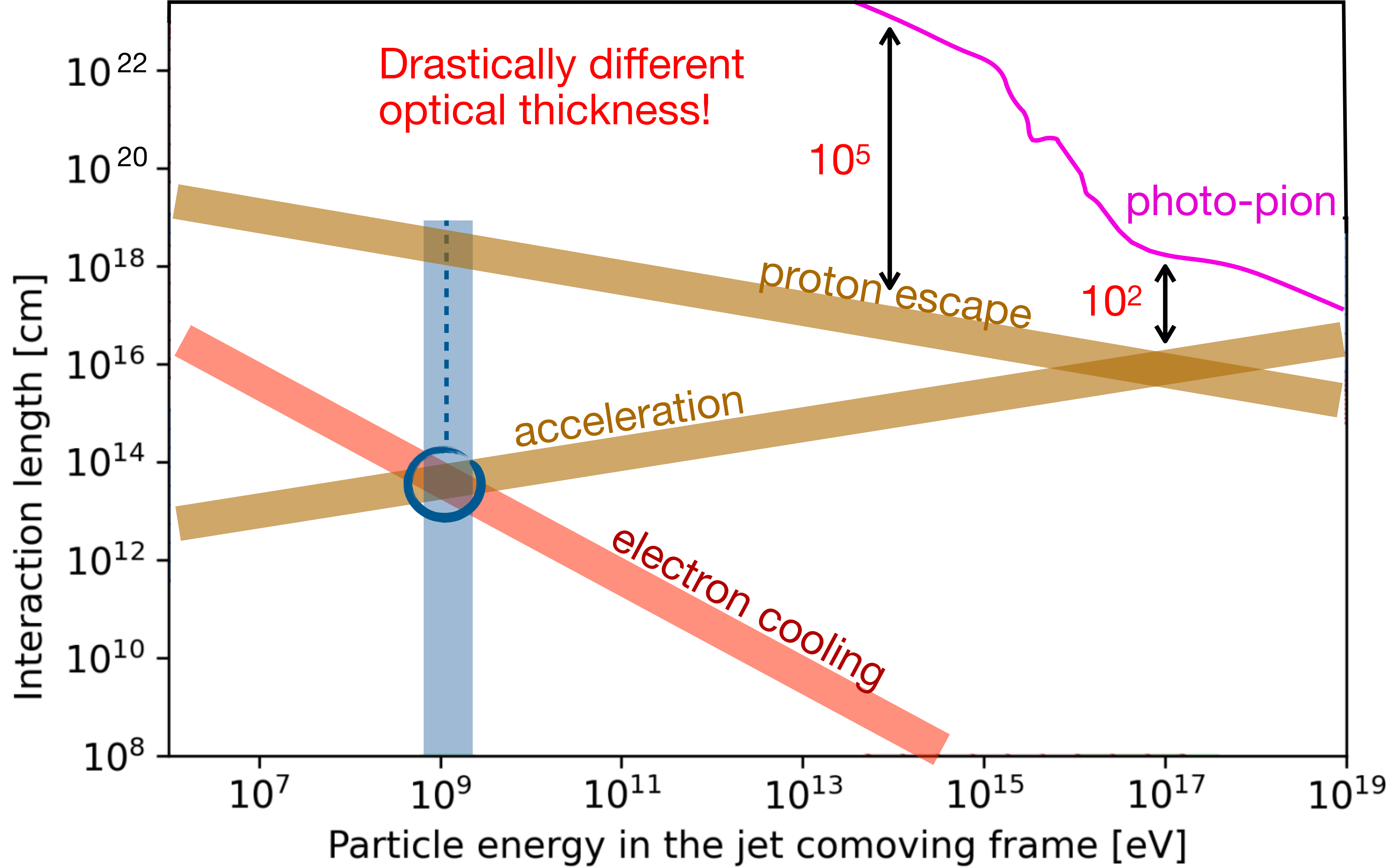


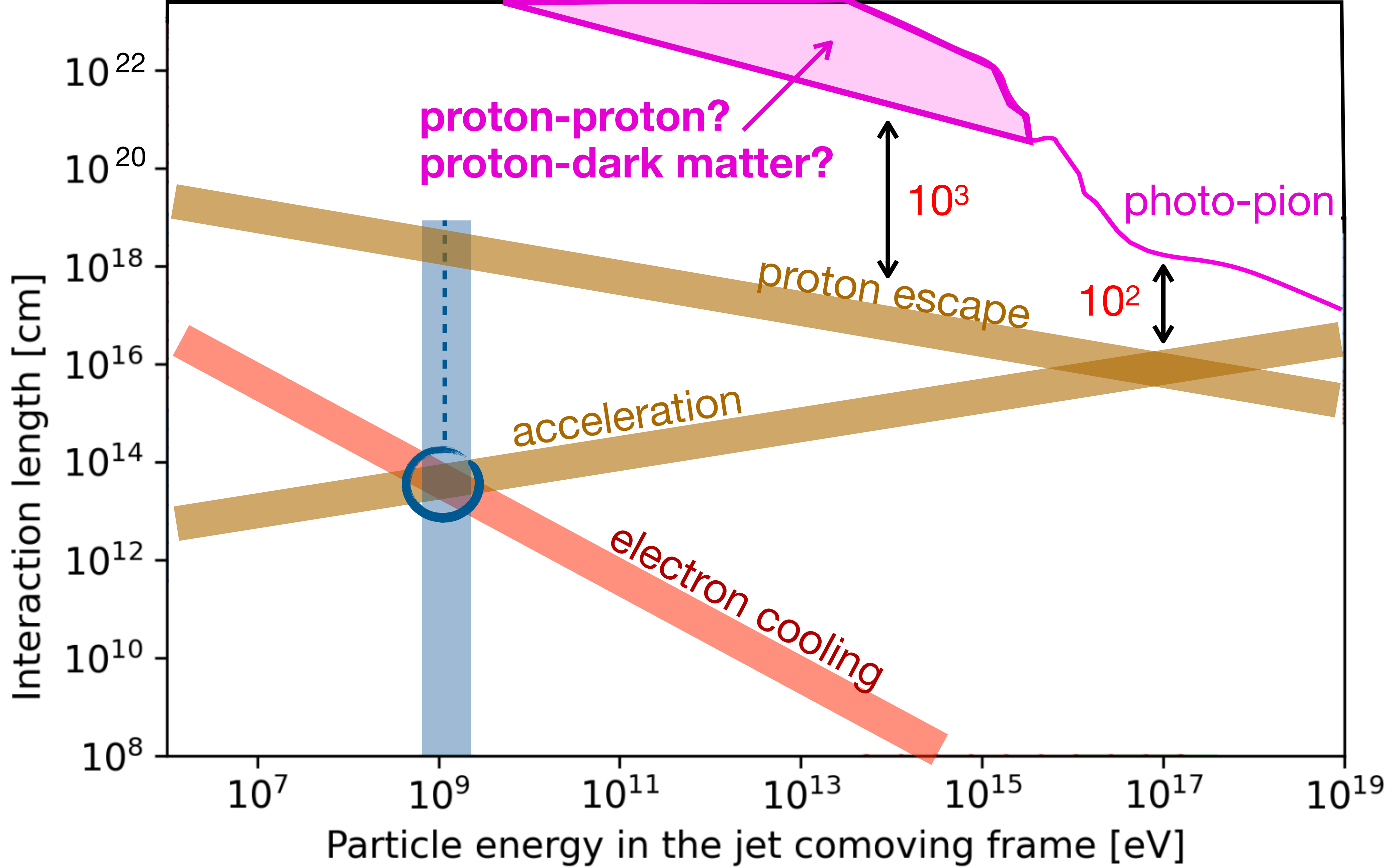
TXS 0506+056, a decade on: what do we know?



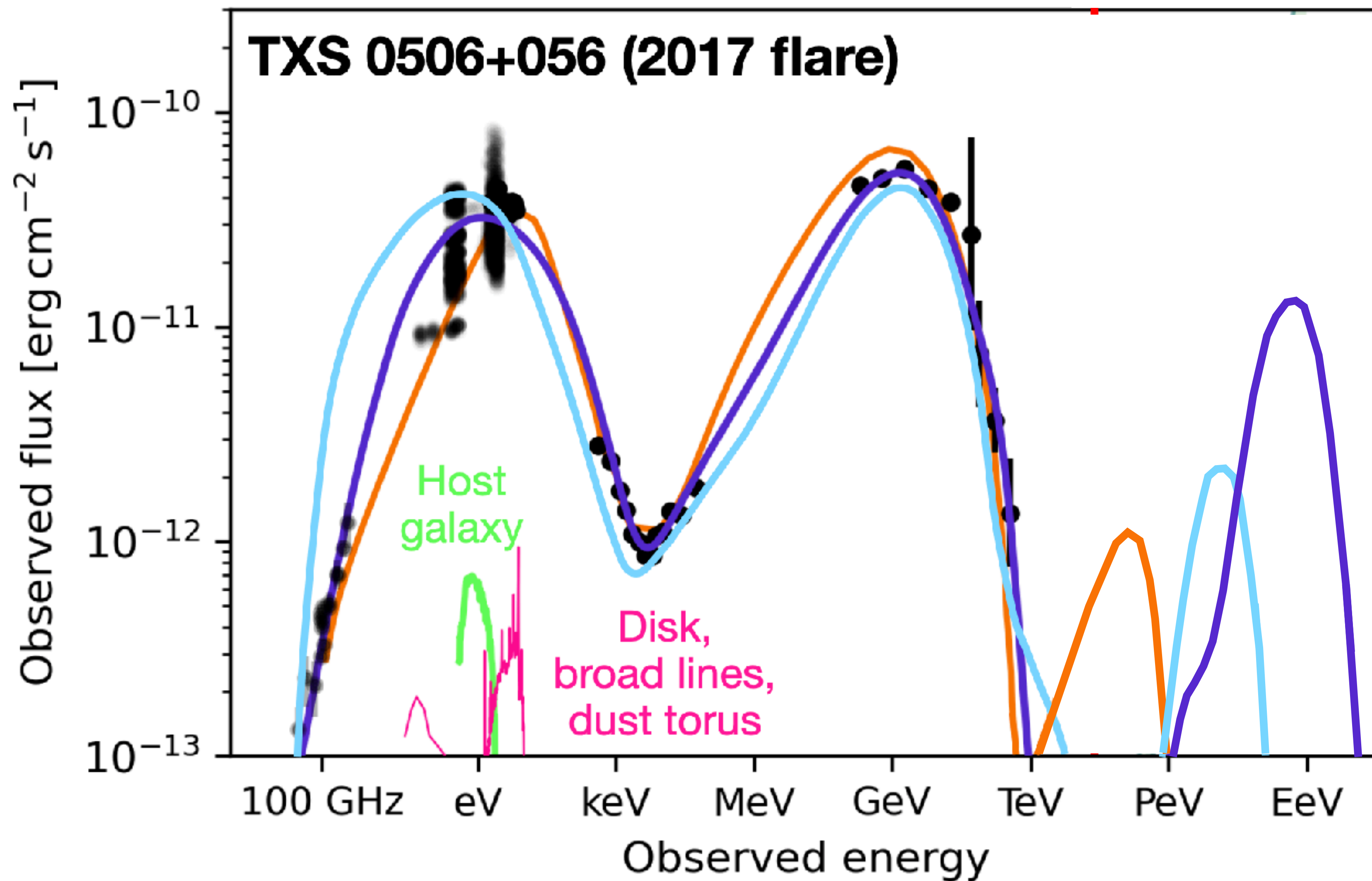
TXS 0506+056, a decade on: what do we know?

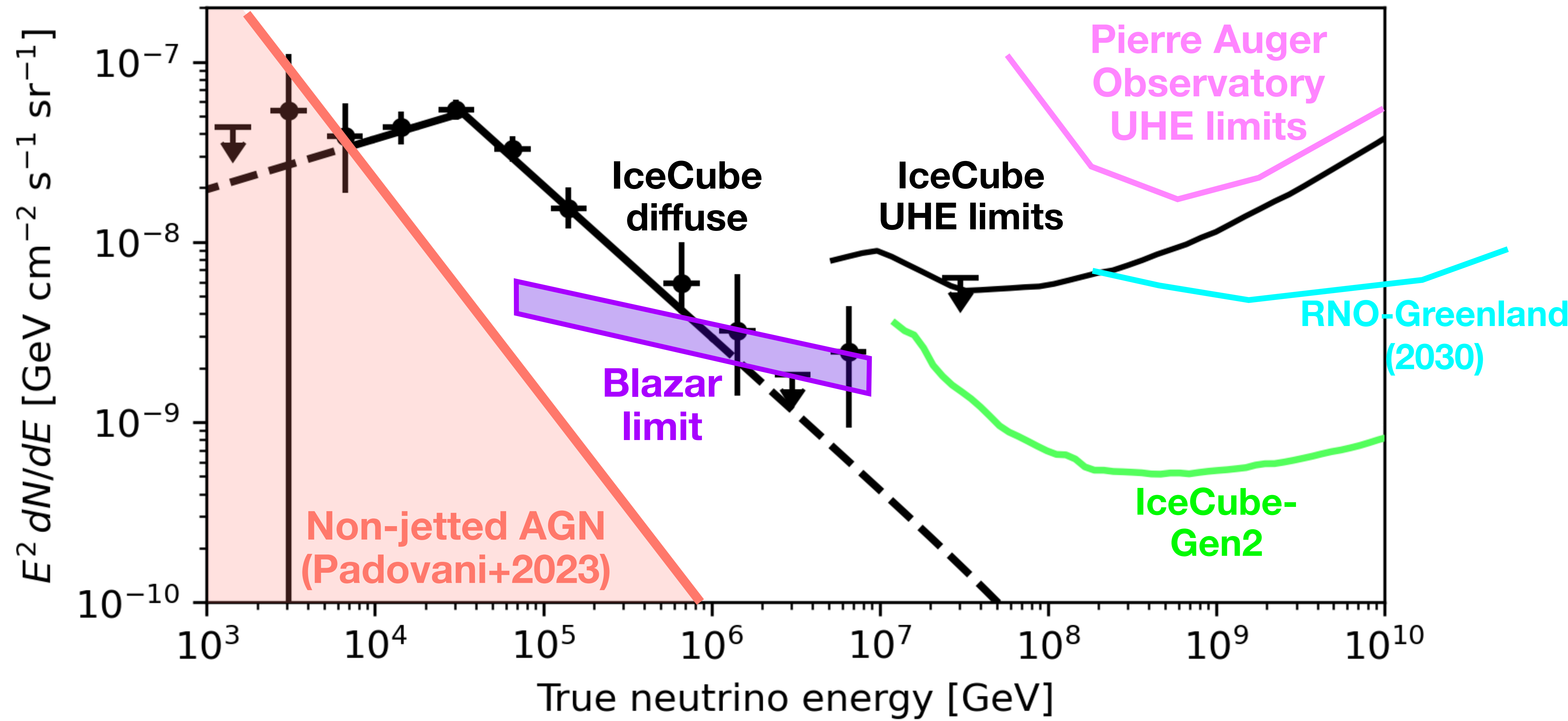




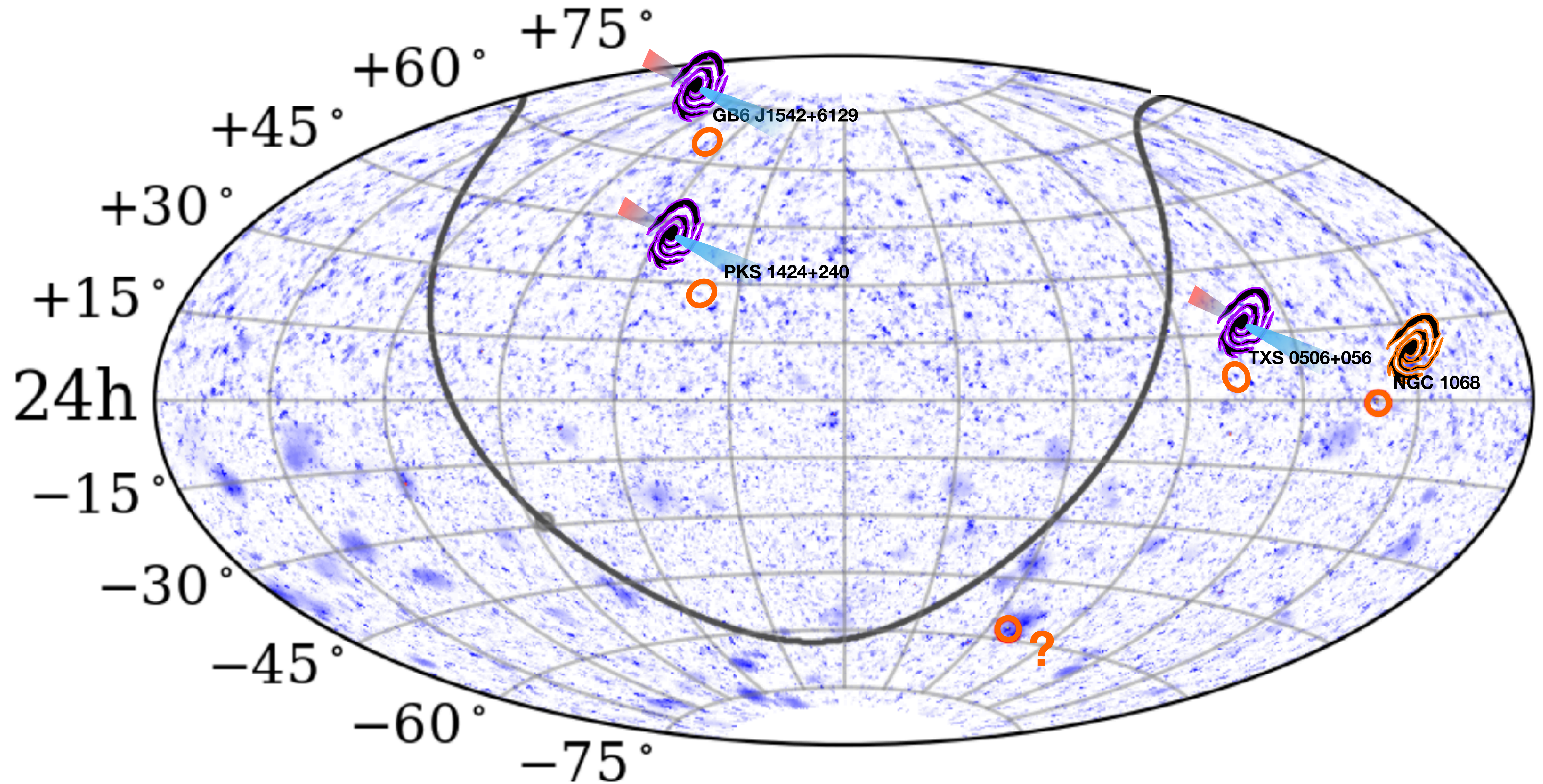


TXS 0506+056, a decade on: what do we know?

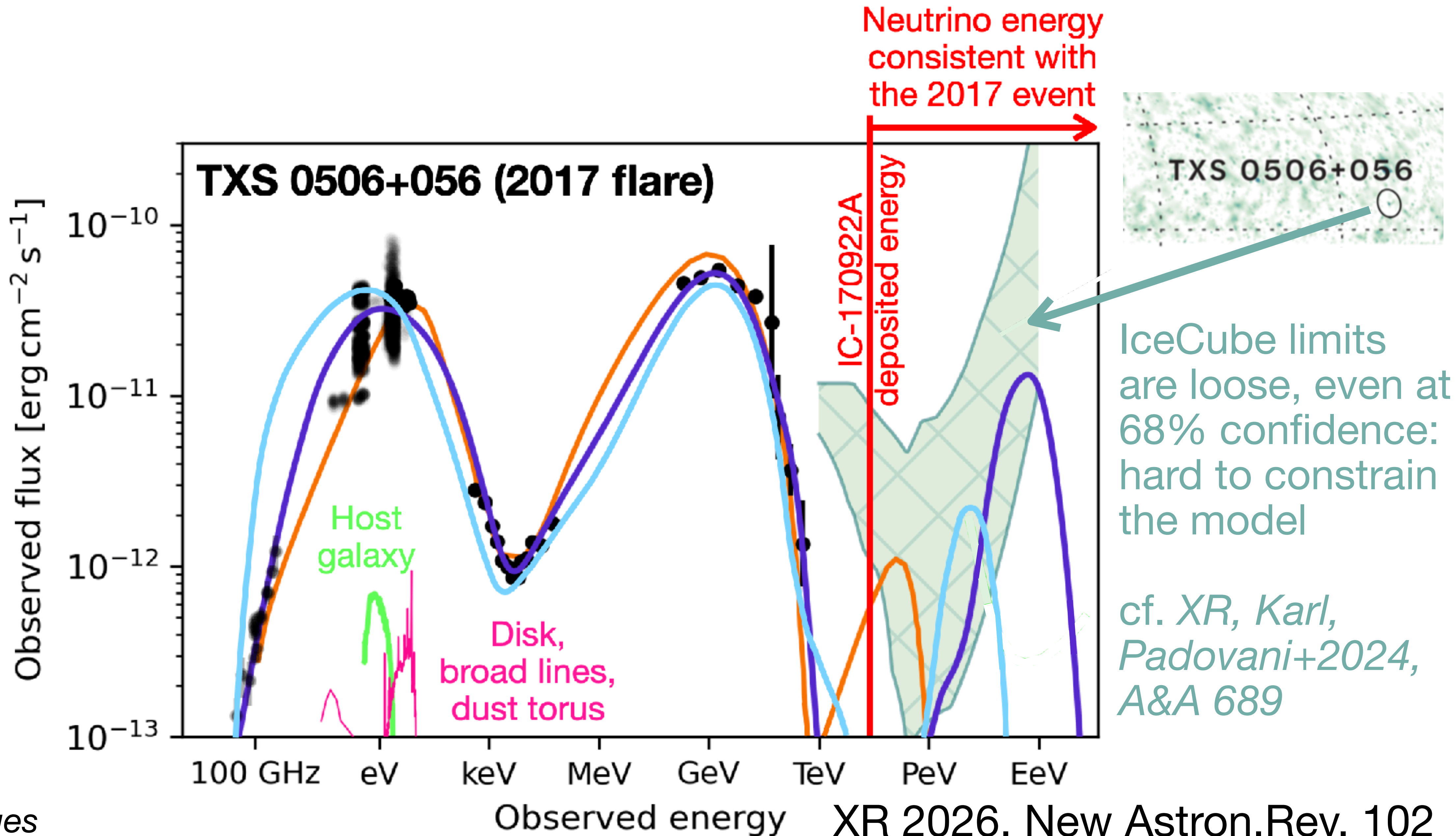




New **IceTracks-DR2** : 14 years of **muon tracks** (IceCube Collaboration, arXiv:2605.19040)

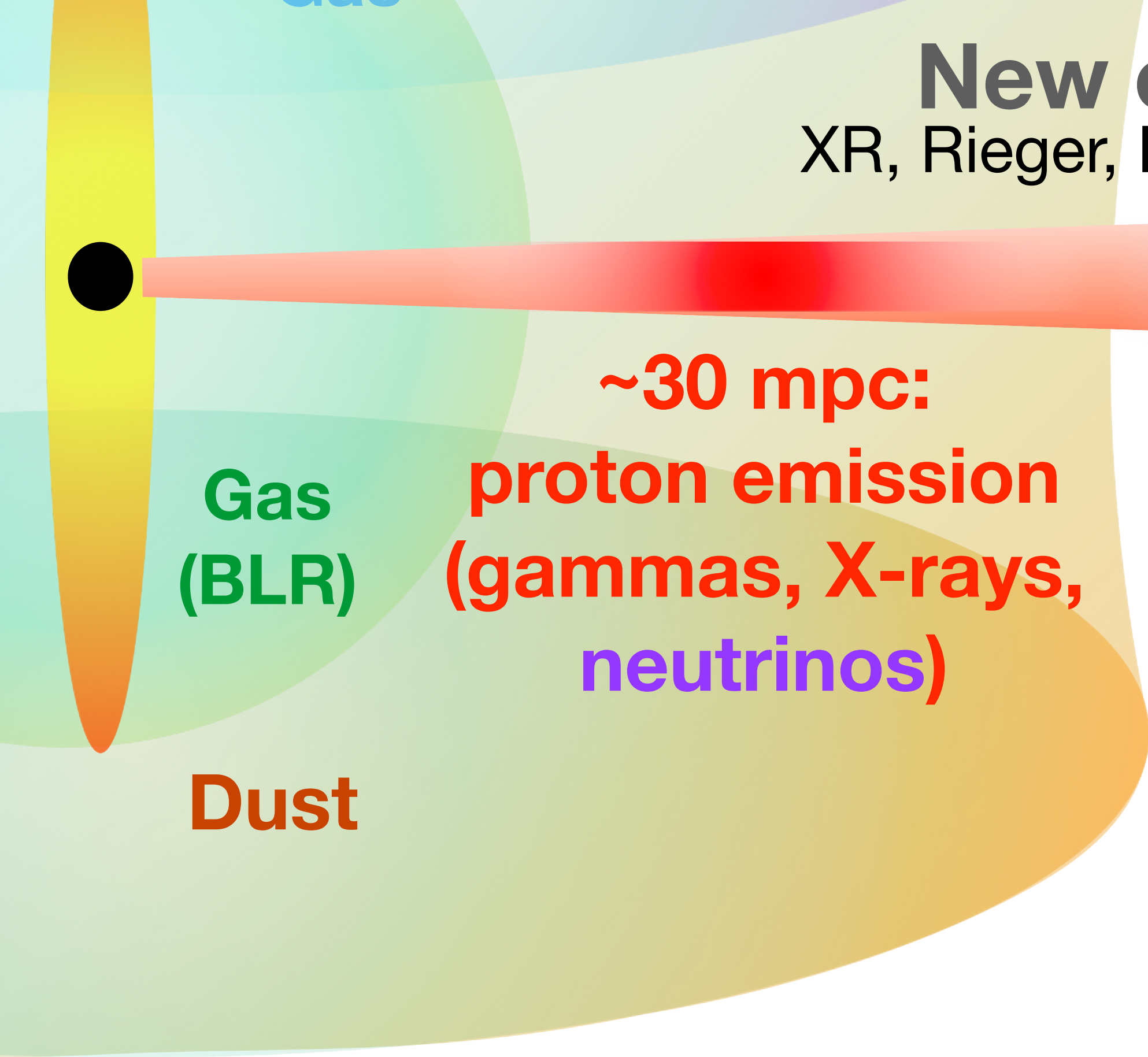


TXS 0506+056, a decade on: what do we know?



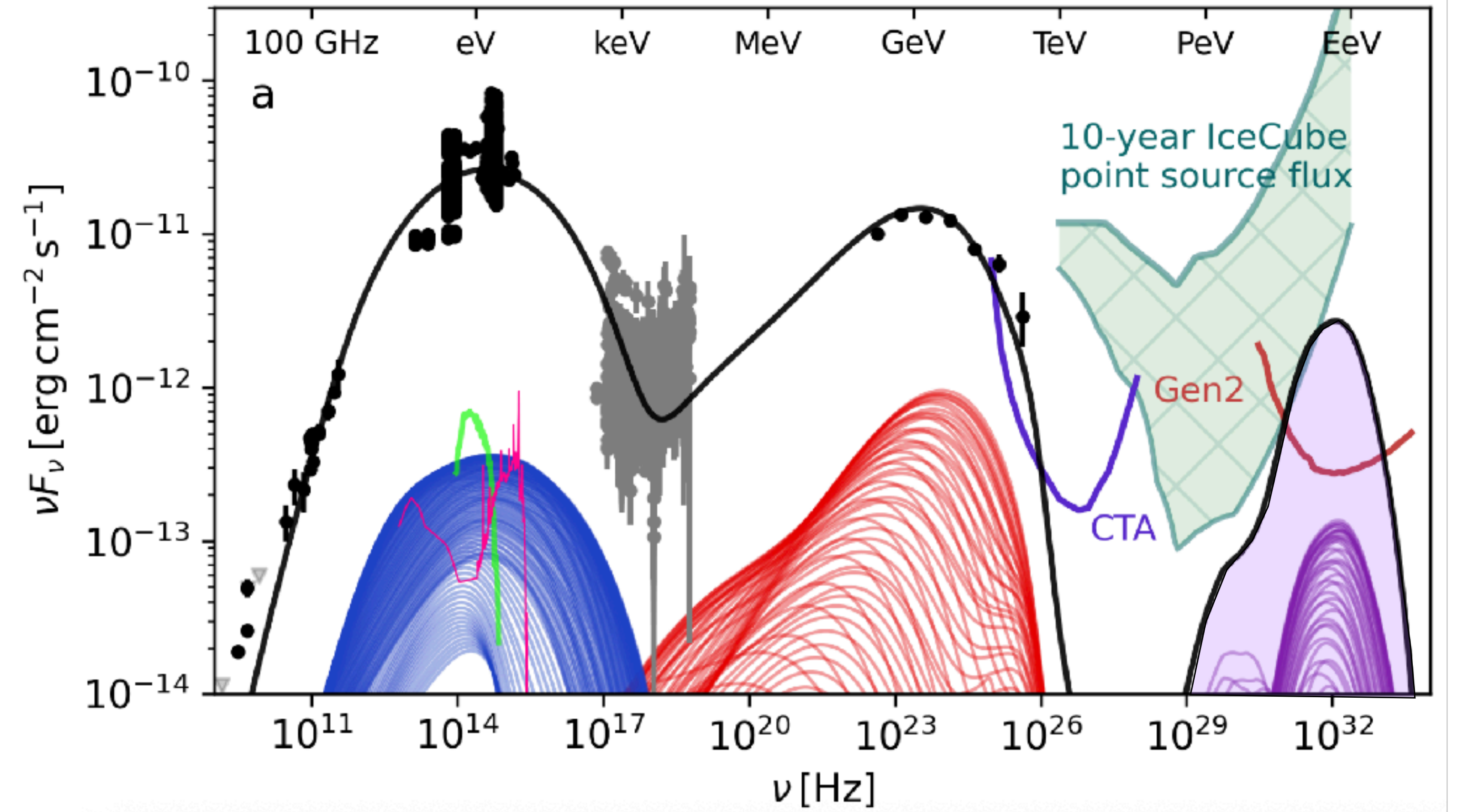
New extended jet model

XR, Rieger, Bohdan & Padovani 2026, A&A 706



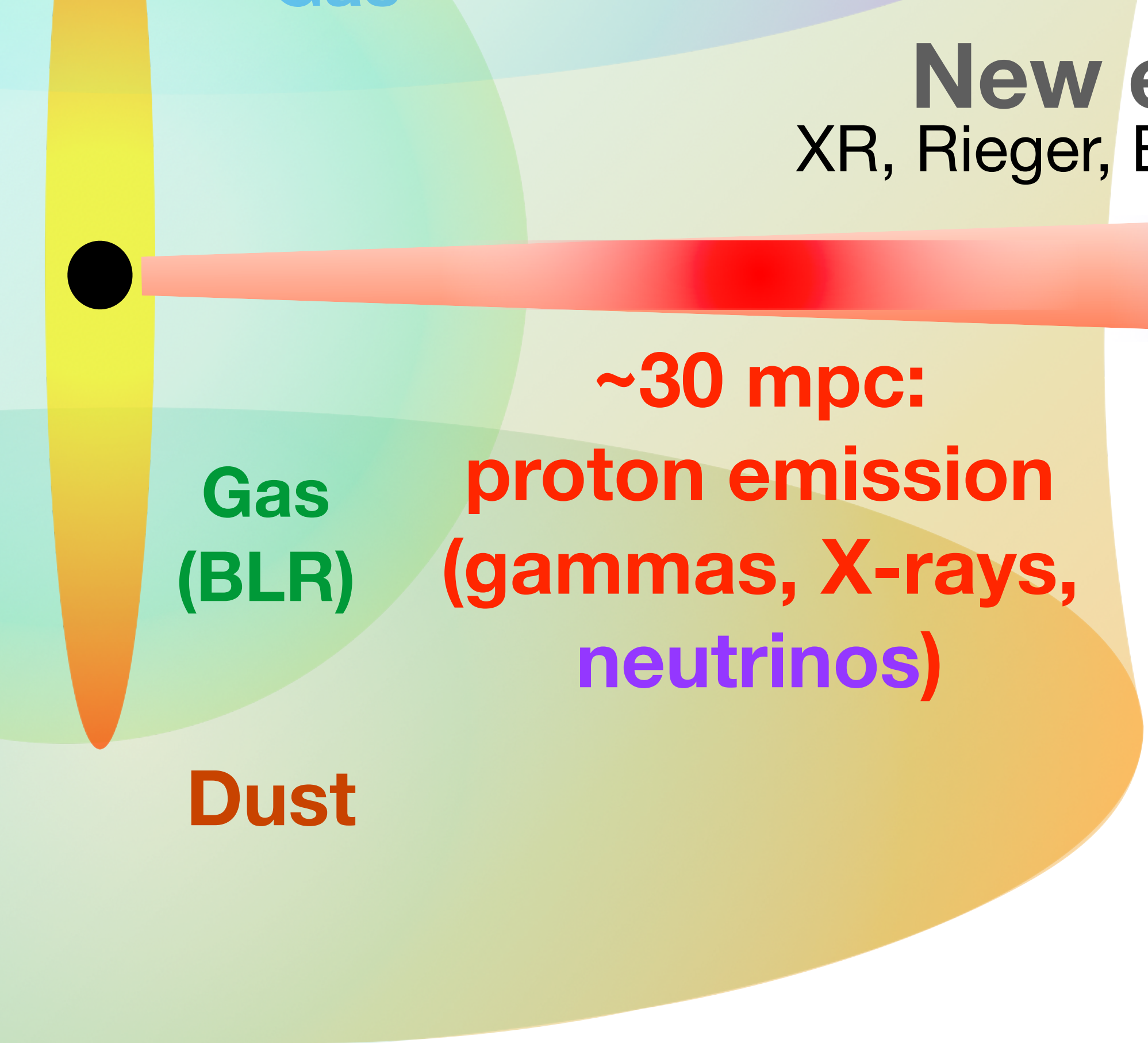
~ pc:
optical

TXS 0506+056 (quiescent)



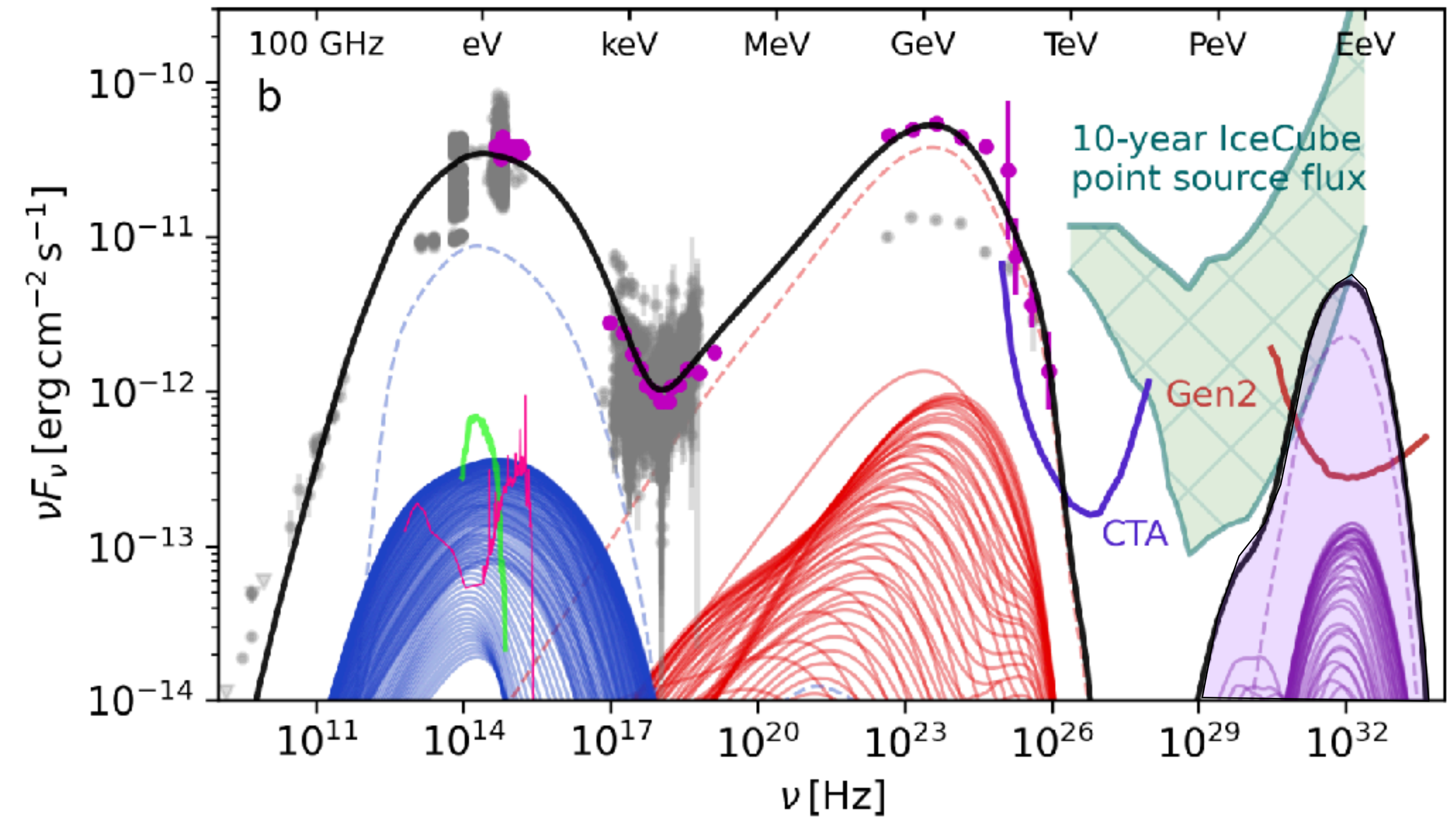
New extended jet model

XR, Rieger, Bohdan & Padovani 2026, A&A 706



~ pc:
optical

TXS 0506+056 (2017 flare)



New extended jet model

XR, Rieger, Bohdan & Padovani 2026, A&A 706



Single-zone models:

Pheno parameters
(mag field, particle
energies, “blob” size
and speed,...)

Single
parameter set
(mainly descriptive)

Parameter
space is confined to
single zone

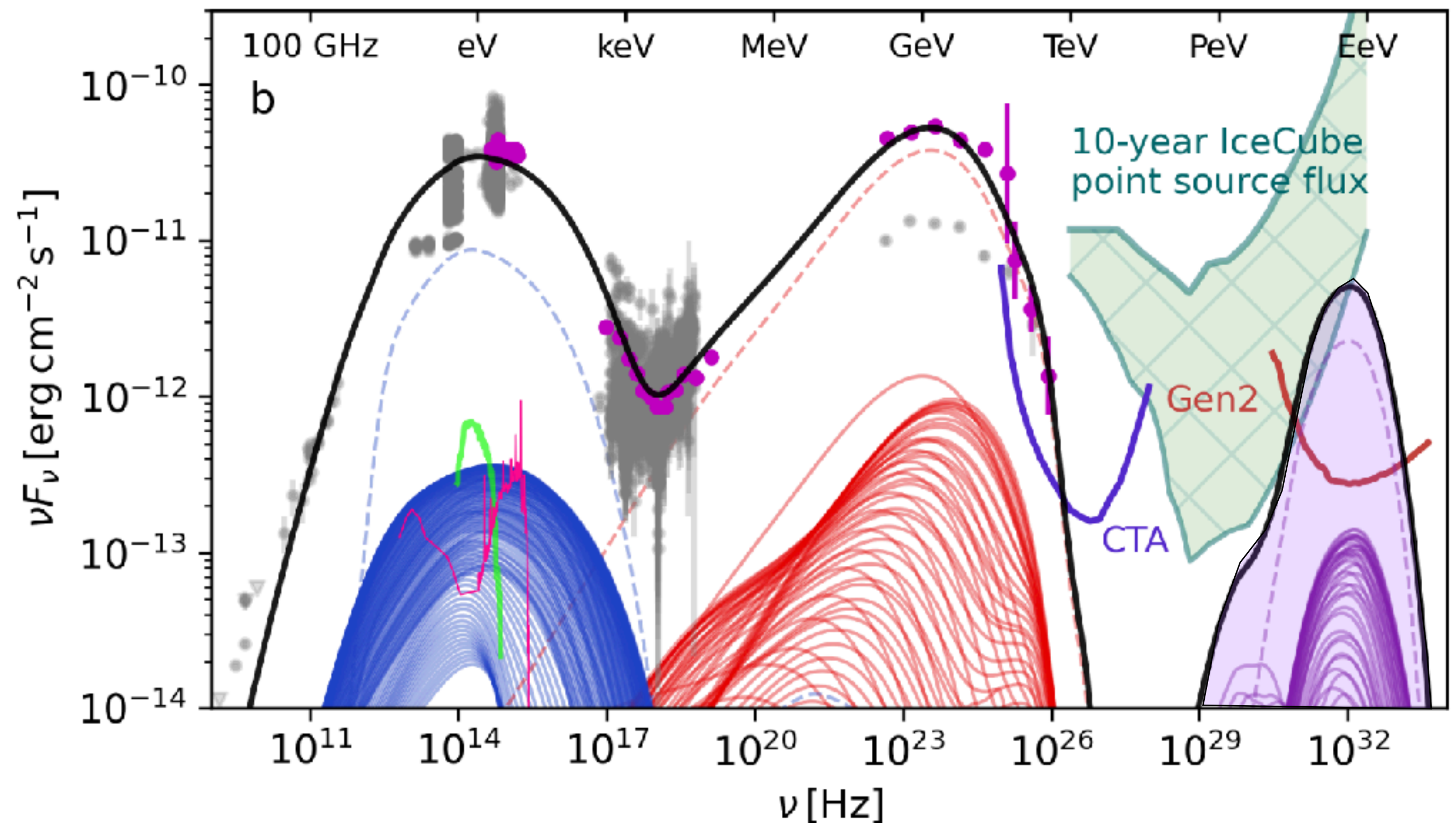
Extended jet models:

Dynamic parameters
(Jet power, dissipation,
turbulence, diffusion,
density, collimation...)

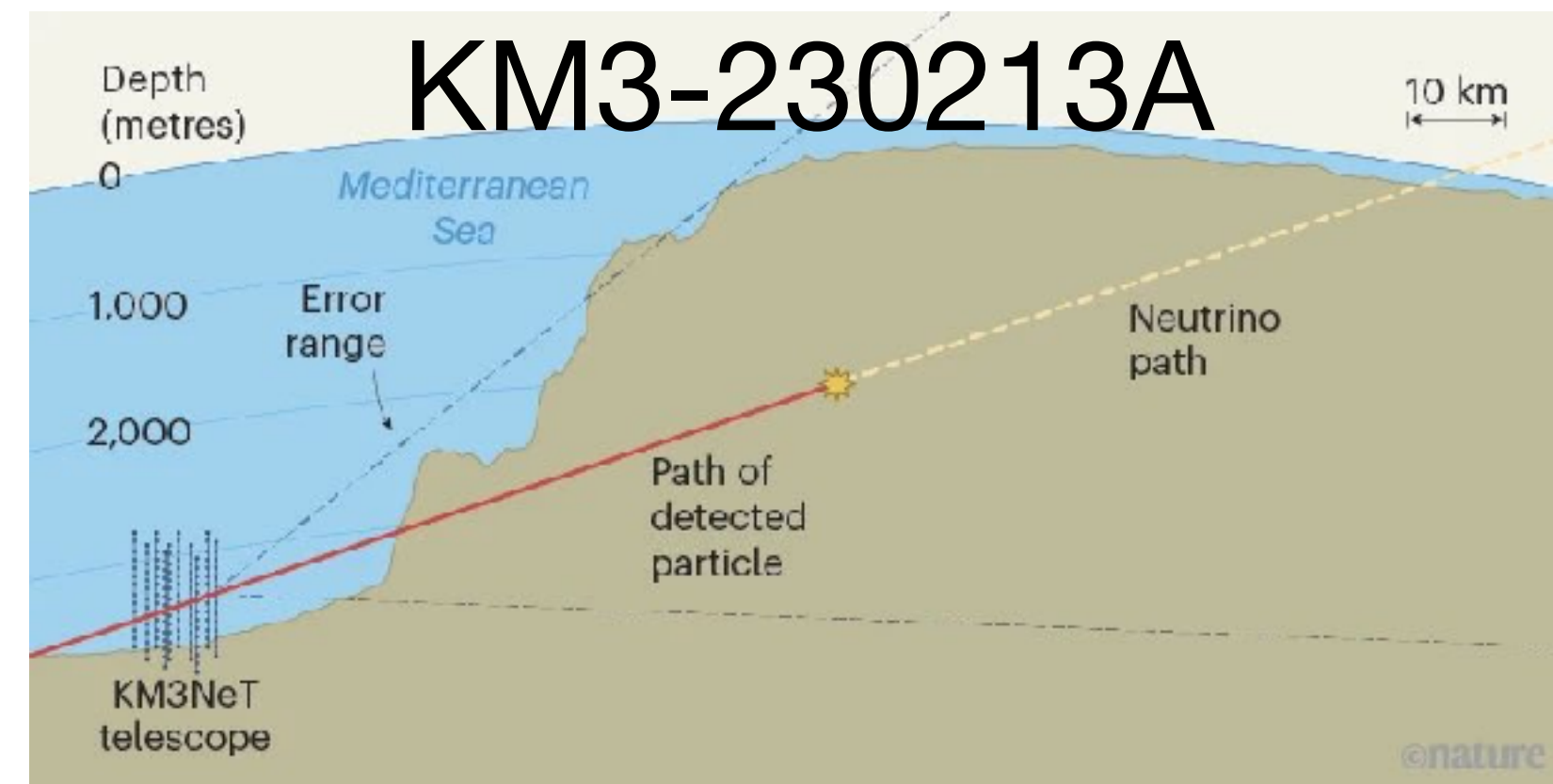
Parameters change
along the jet
(assess particle
acceleration+diffusion)

Access to hidden
solutions, including
sub-Eddington
hadronic ones →

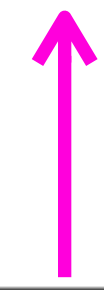
TXS 0506+056 (2017 flare)



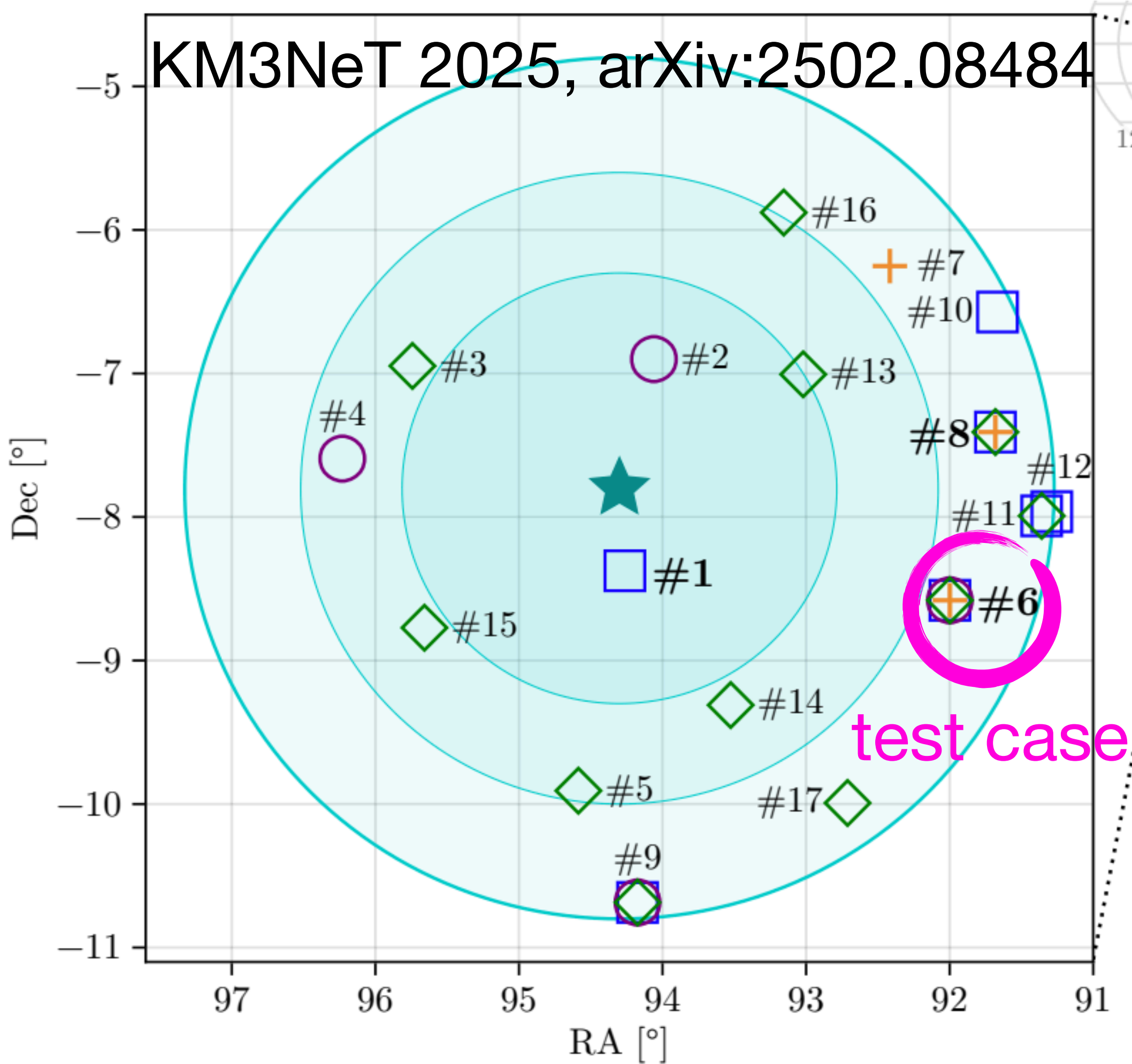
Did the KM3-230213A originate in a blazar?



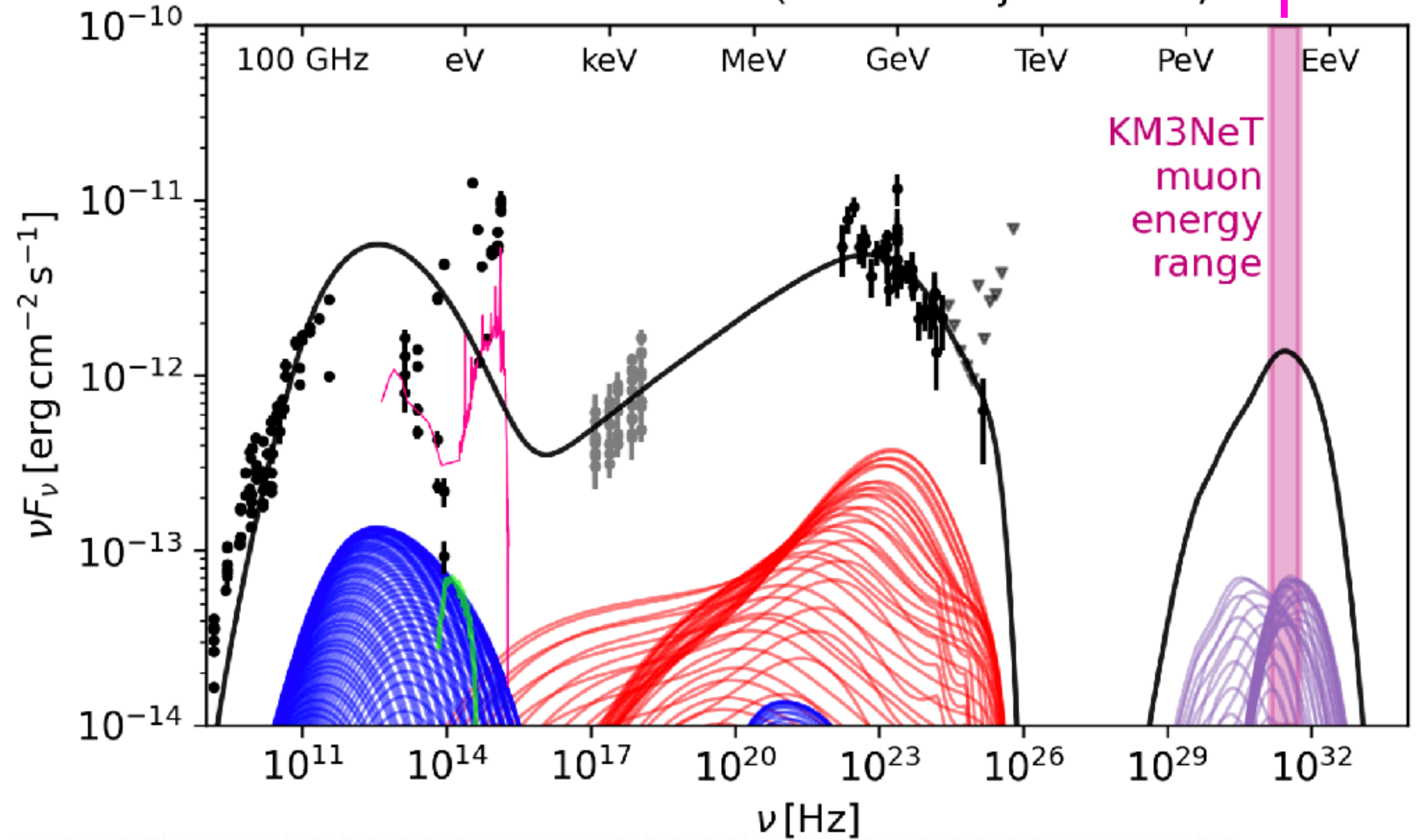
energetically feasible (but too early to tell)



KM3NeT 2025, arXiv:2502.08484

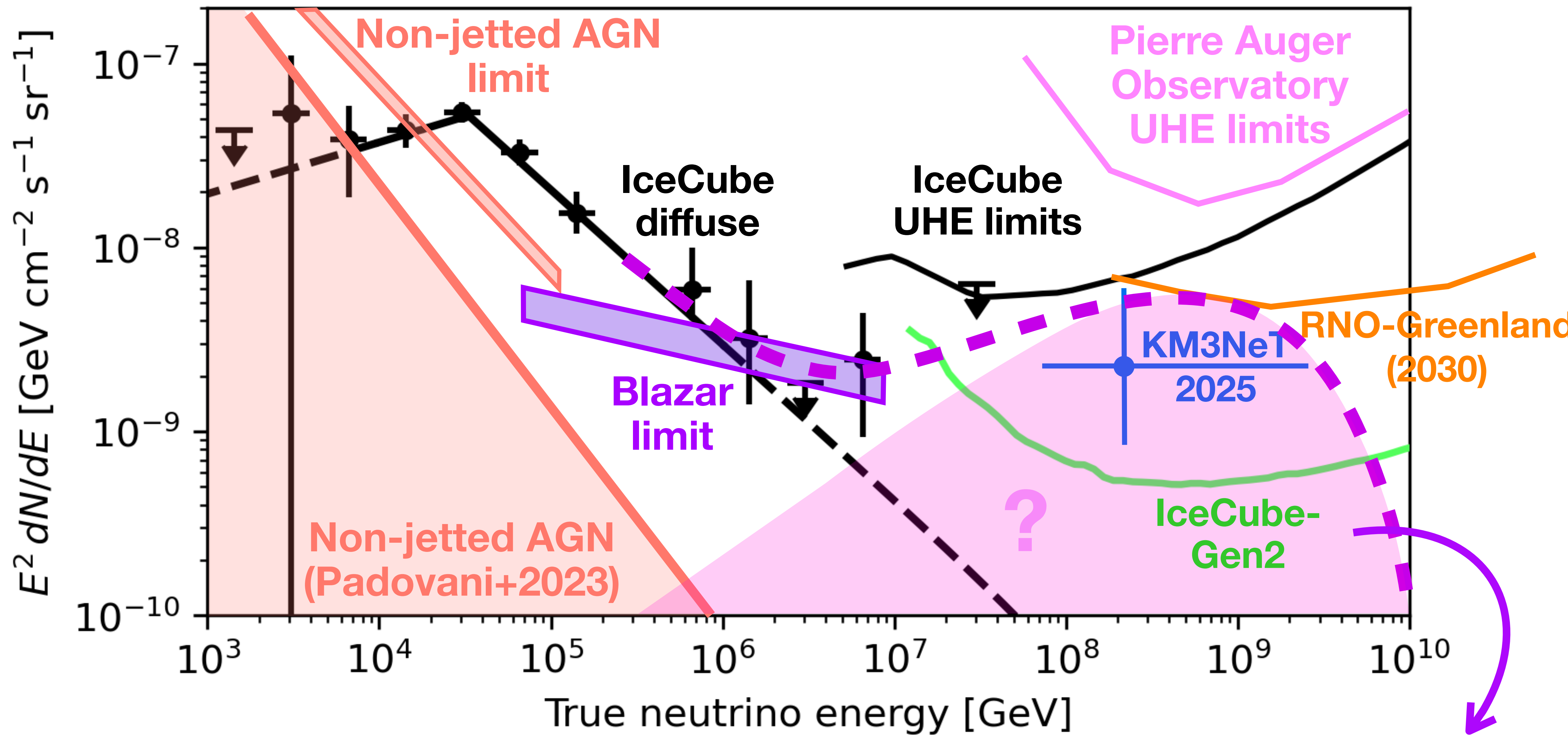


PKS 0605 – 85 (extended jet model)



XR, Rieger, Bohdan & Padovani 2026, A&A 706

Has the 2023 KM3NeT event lifted the UHE veil?



Flux consistent with neutrinos, gammas, & cosmic rays