Particle acceleration at Ultra-Fast Outflows (UFOs) of AGNs

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With Pierre Cristofari and Andreas Zech

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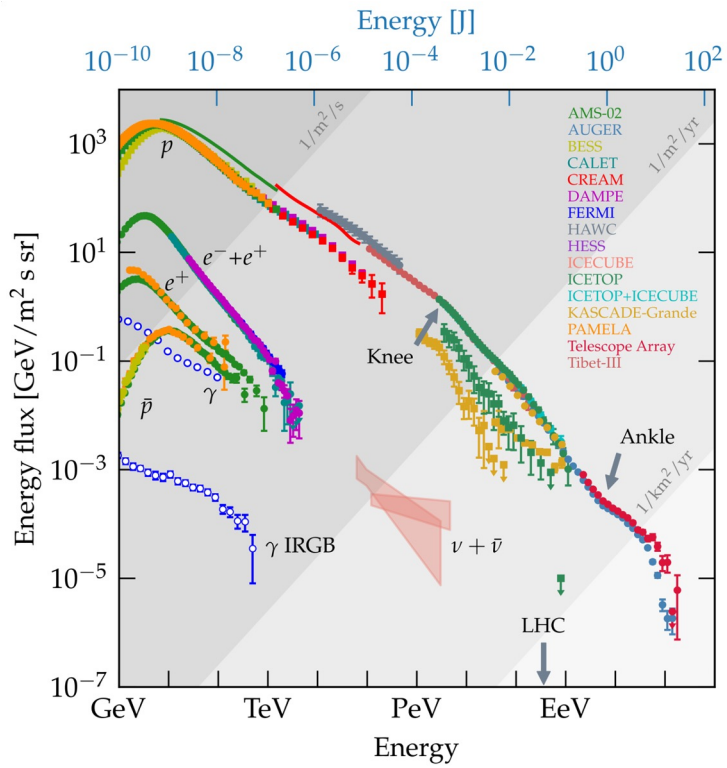

[Evoli 2021]

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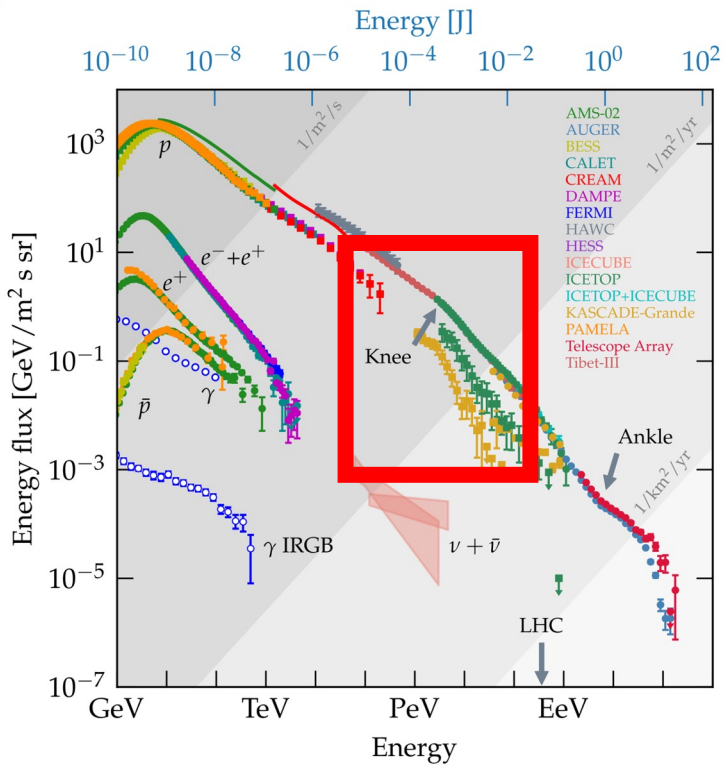

UFOs

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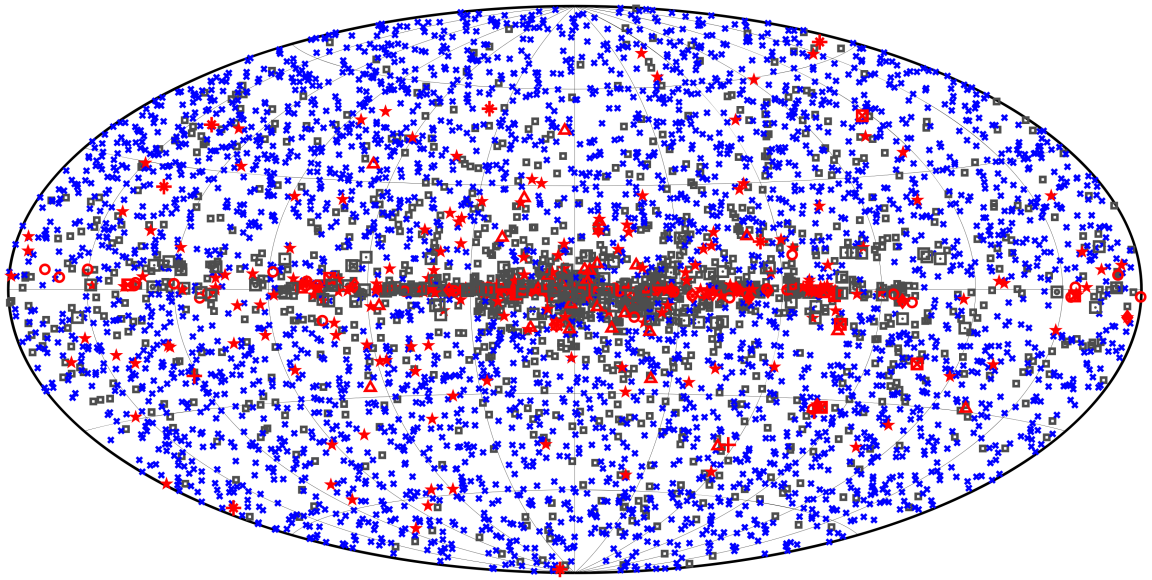

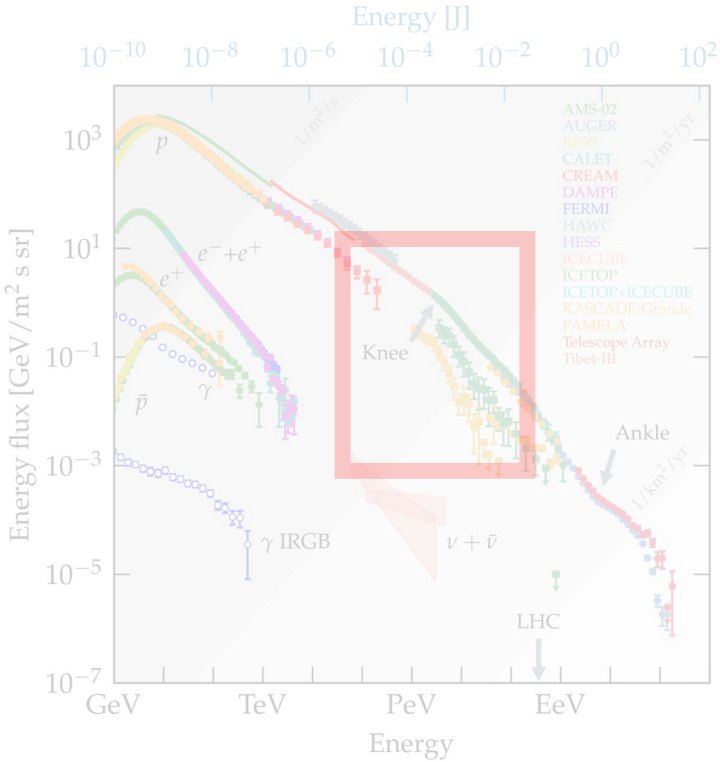

UFOs

[Abdollahi et al 2020, ApJS 4FGL]

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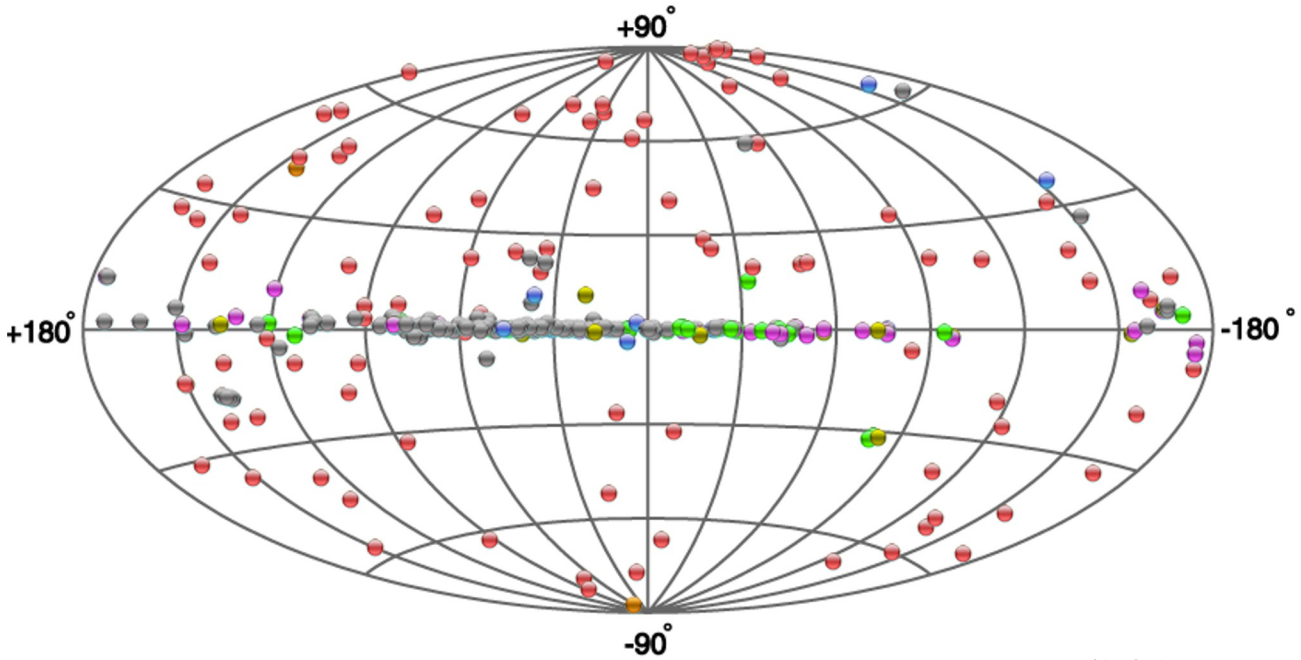
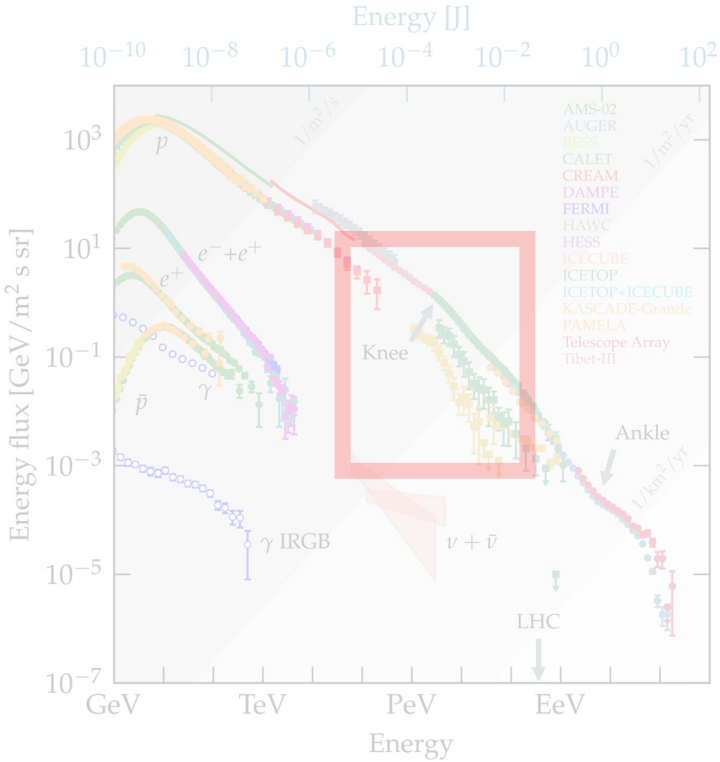


[TeVCat, mai 2024]



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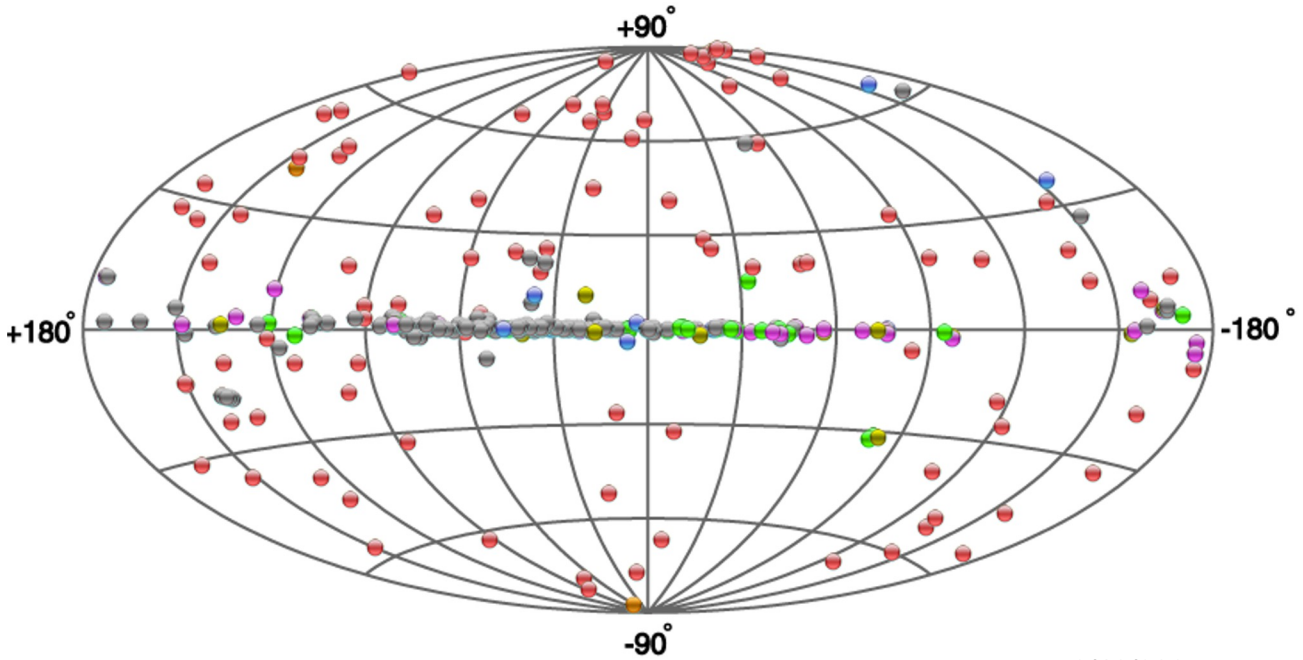

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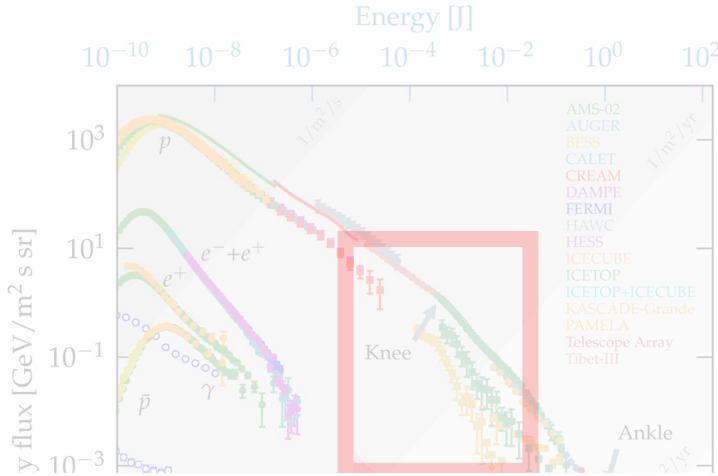
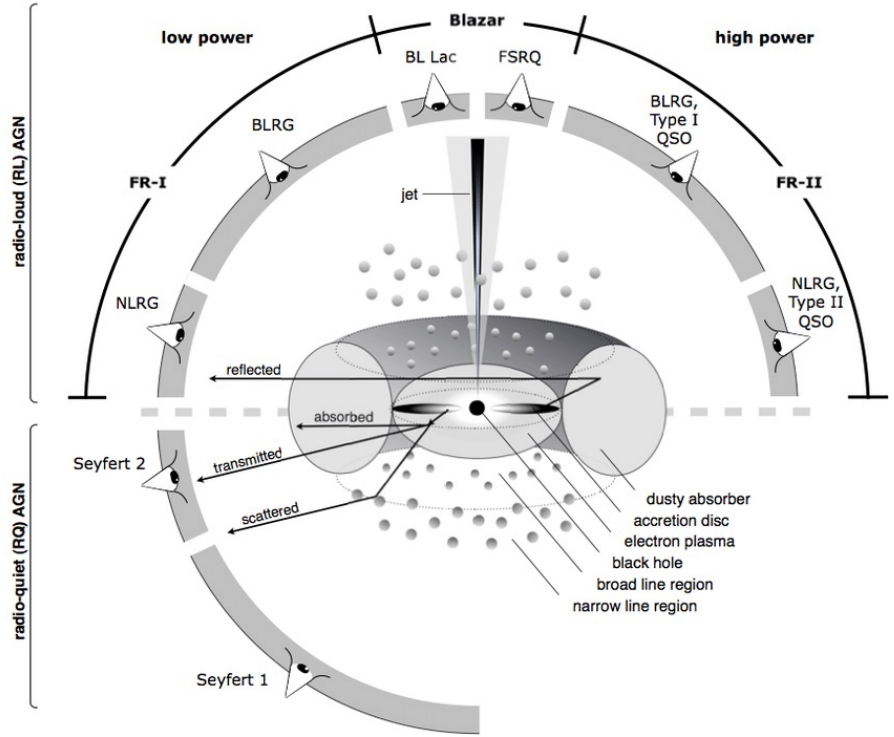


UFOs



[Beckmann, Shrader 2012]

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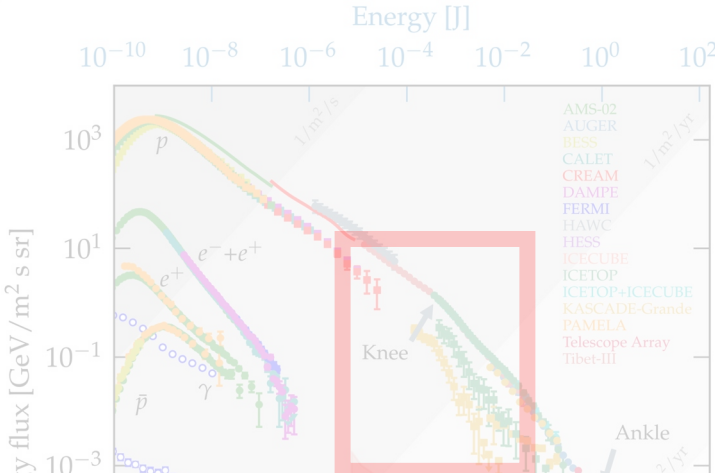
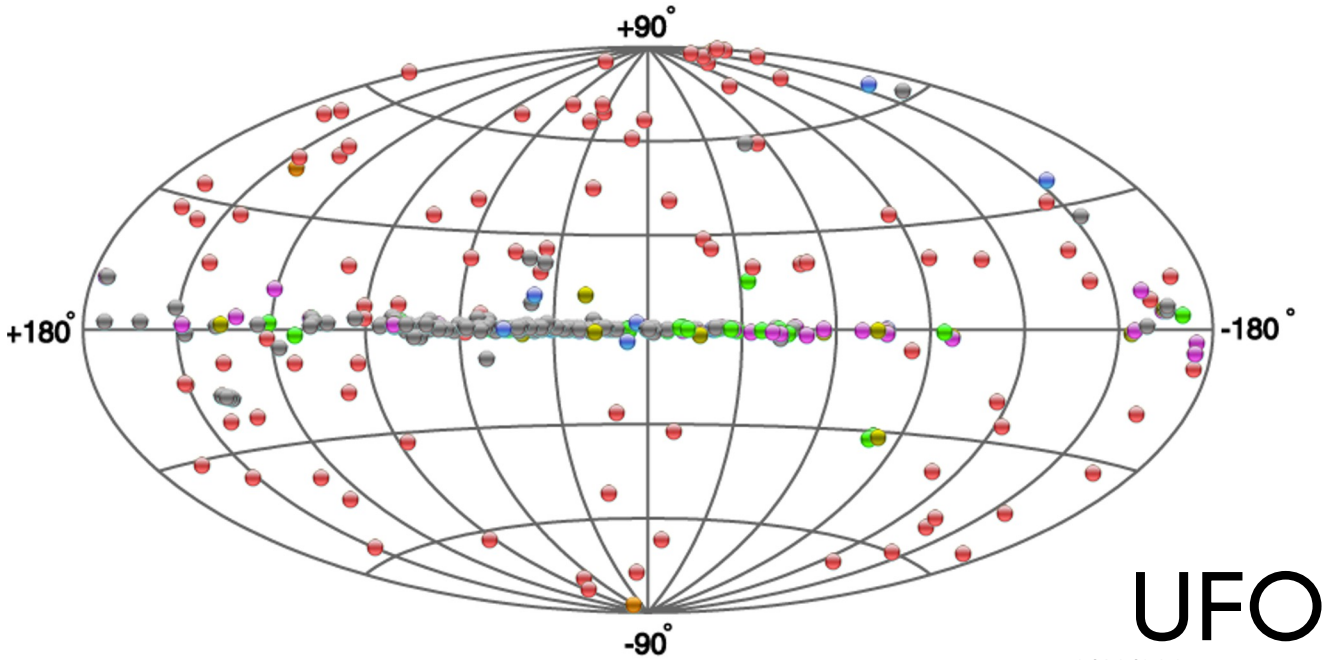
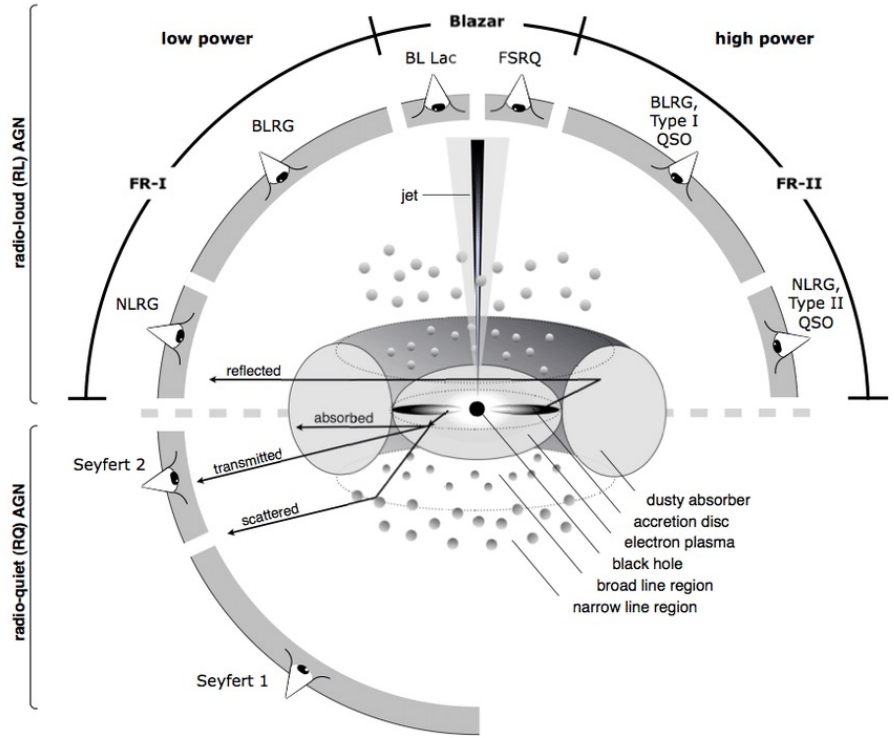


UFOs





UFOs in $\approx$ **40 – 60%** of AGNs

[TeVCat, mai 2024] [Beckmann, Shrader 2012]

UFOs and particle acceleration

Wide angle mildly relativistic winds from AGN

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Blueshifted Fe XXV lines in X ray spectra

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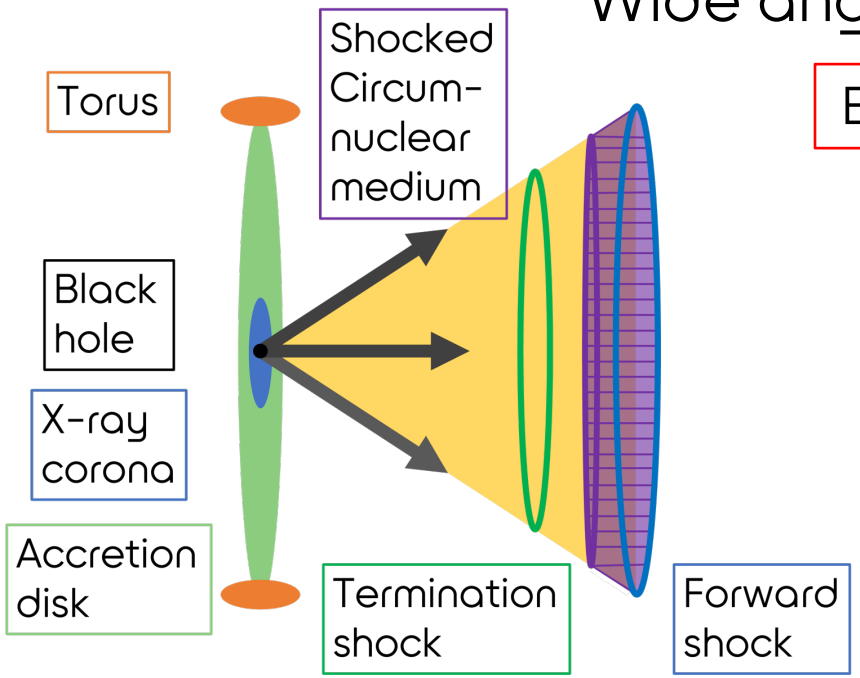
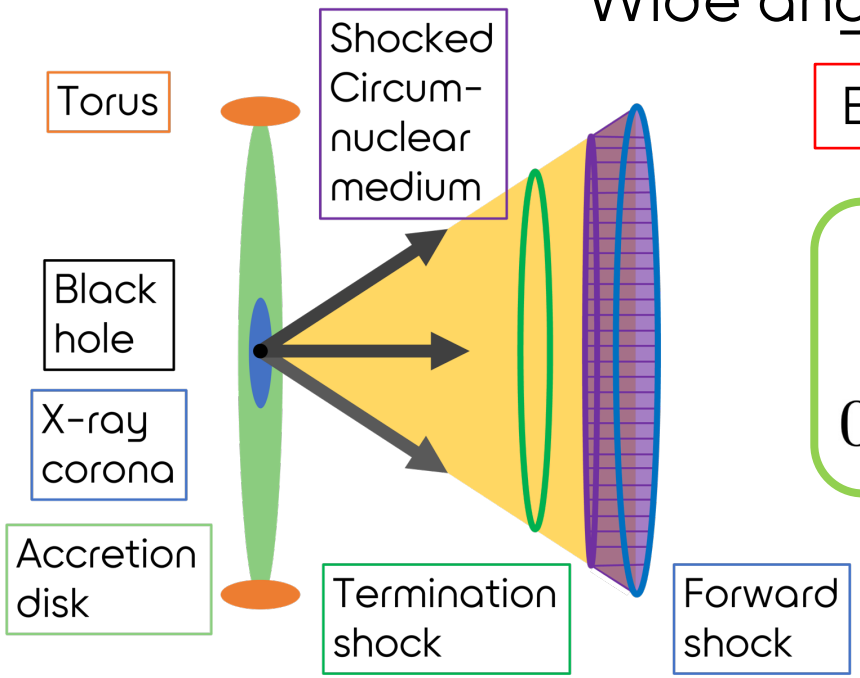


UFOs and particle acceleration

Wide angle mildly relativistic winds from AGN



Blueshifted Fe XXV lines in X ray spectra

$$0.1 \lesssim \frac{u_{sh}}{c} \lesssim 0.5$$

$$0.1 \lesssim \dot{M} \lesssim 200\,\mathrm{M}_\odot\,\mathrm{yr}^{-1}$$

UFOs and particle acceleration

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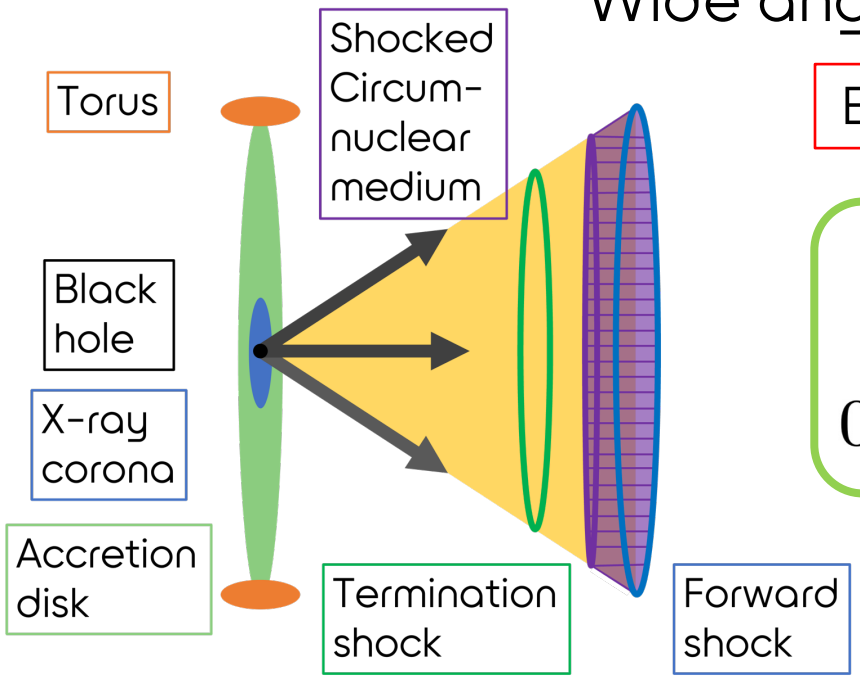

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Strong collisionless shocks in dense medium

Diffusive Shock Acceleration

$$f(p) = A \left(\frac{p}{p_0}\right)^{-\alpha} \exp\left(-\frac{p}{p_{\max}}\right)$$

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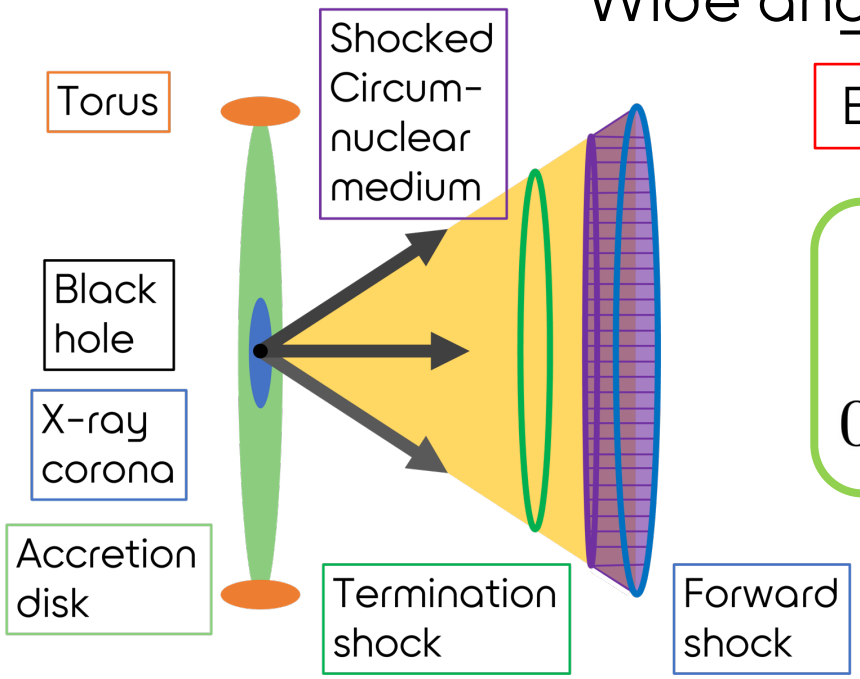

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Physically motivated model to investigate the CTAO detectability

Parameter space for best candidates: $\xi \geq 0.05$, $\alpha \leq 3.9$ and $n_0 \geq 100\ cm^{-3}$