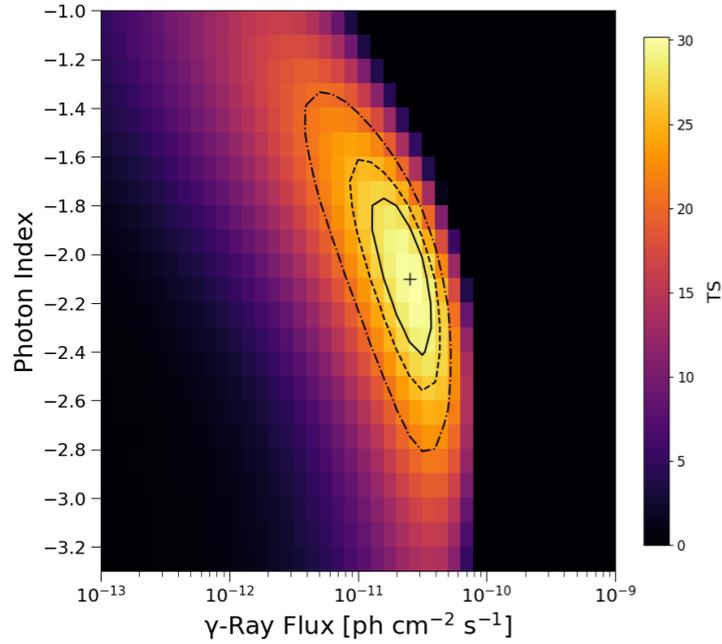
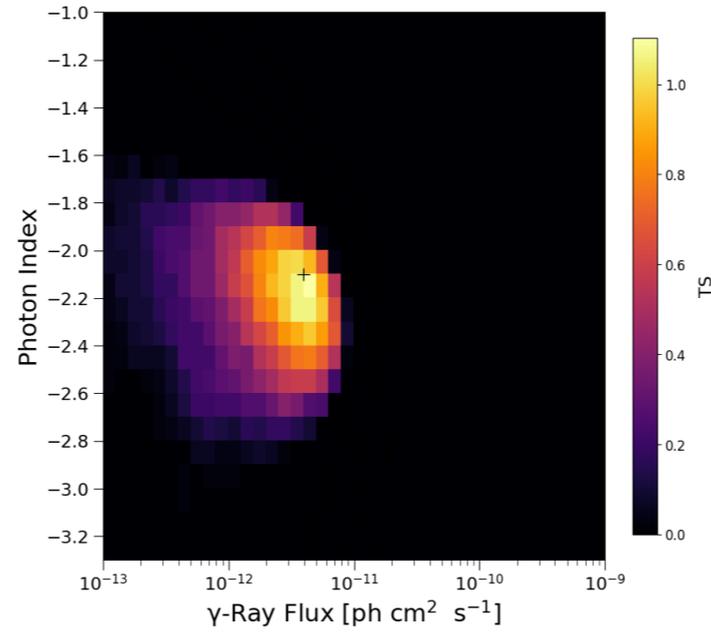


# Gamma rays from Fast Black-Hole Winds: Executive Summary



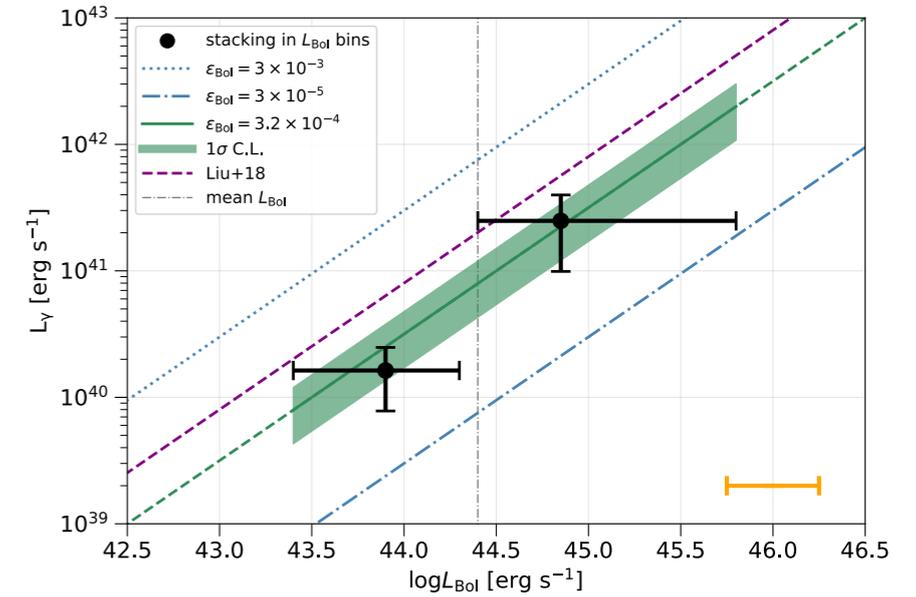
- **Benchmark sample**

- 11 UFOs with  $z < 0.1$  and  $v > 0.1c$
- Max TS: 30.1 (5.1 sigma for 2 dof)
- Best index =  $2.1 \pm 0.3$
- Best flux =  $2.51_{-0.93}^{+1.47} \times 10^{-11} \text{ ph cm}^{-2} \text{ s}$



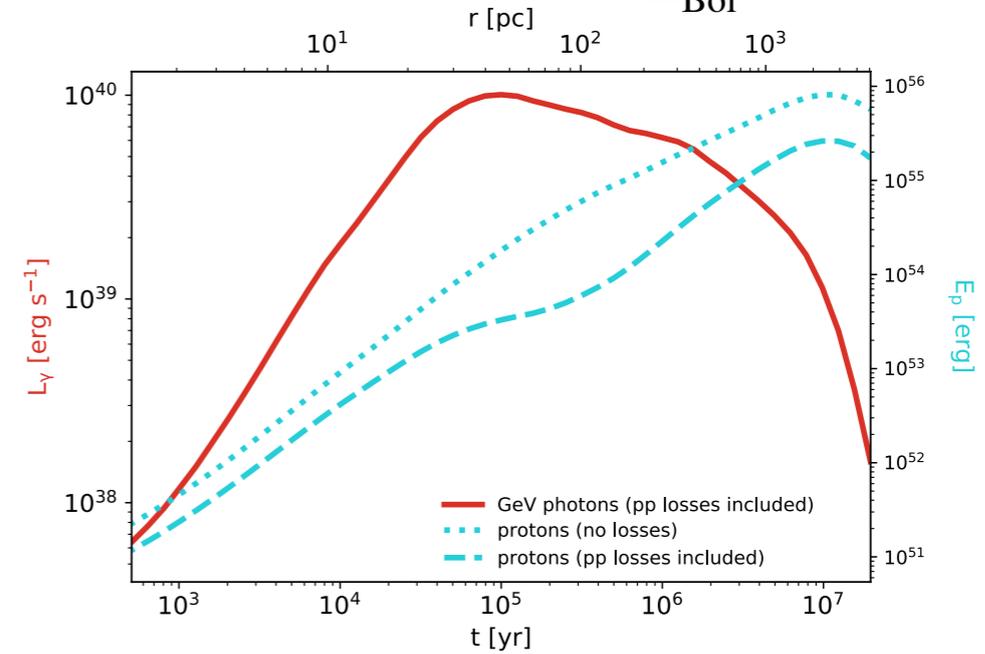
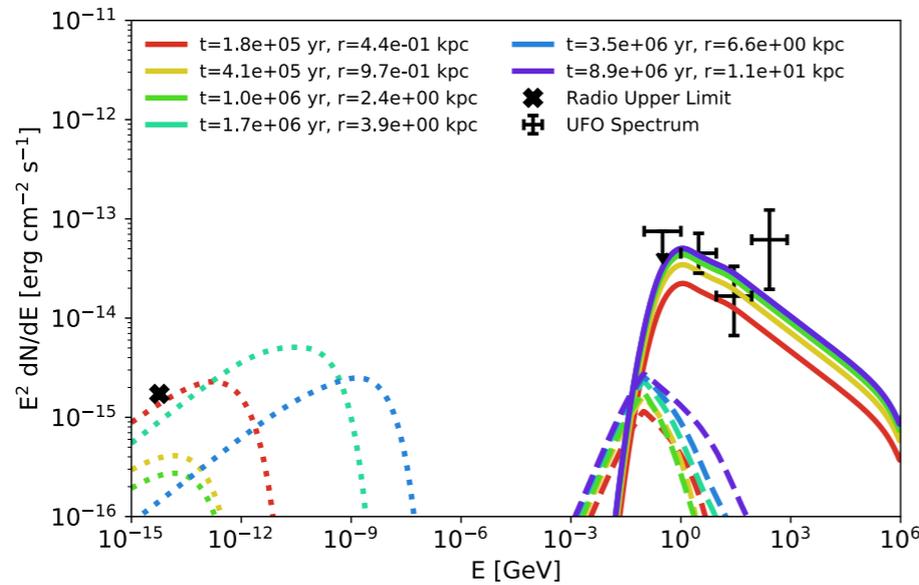
- **Control sample**

- Max TS: 1.1
- Signal also not dominated by star formation nor weak jets



- **Efficiency:** gamma-ray luminosity scales with the bolometric luminosity

$$\epsilon = \frac{L_\gamma}{L_{\text{Bol}}} = 3.2_{-1.5}^{+1.6} \times 10^{-4}$$



- **Model:** hadronic emission resulting from diffusive shock acceleration.
- On average, the forward shock has traveled 20-300 pc away from the SMBH.
- The max energy of protons accelerated at the shock is  $\sim 10^{17}$  eV, making AGN winds a potential source of CRs beyond the knee of the CR spectrum ( $3e15$  eV) and also likely contributors to the EGB and IceCube neutrino flux.