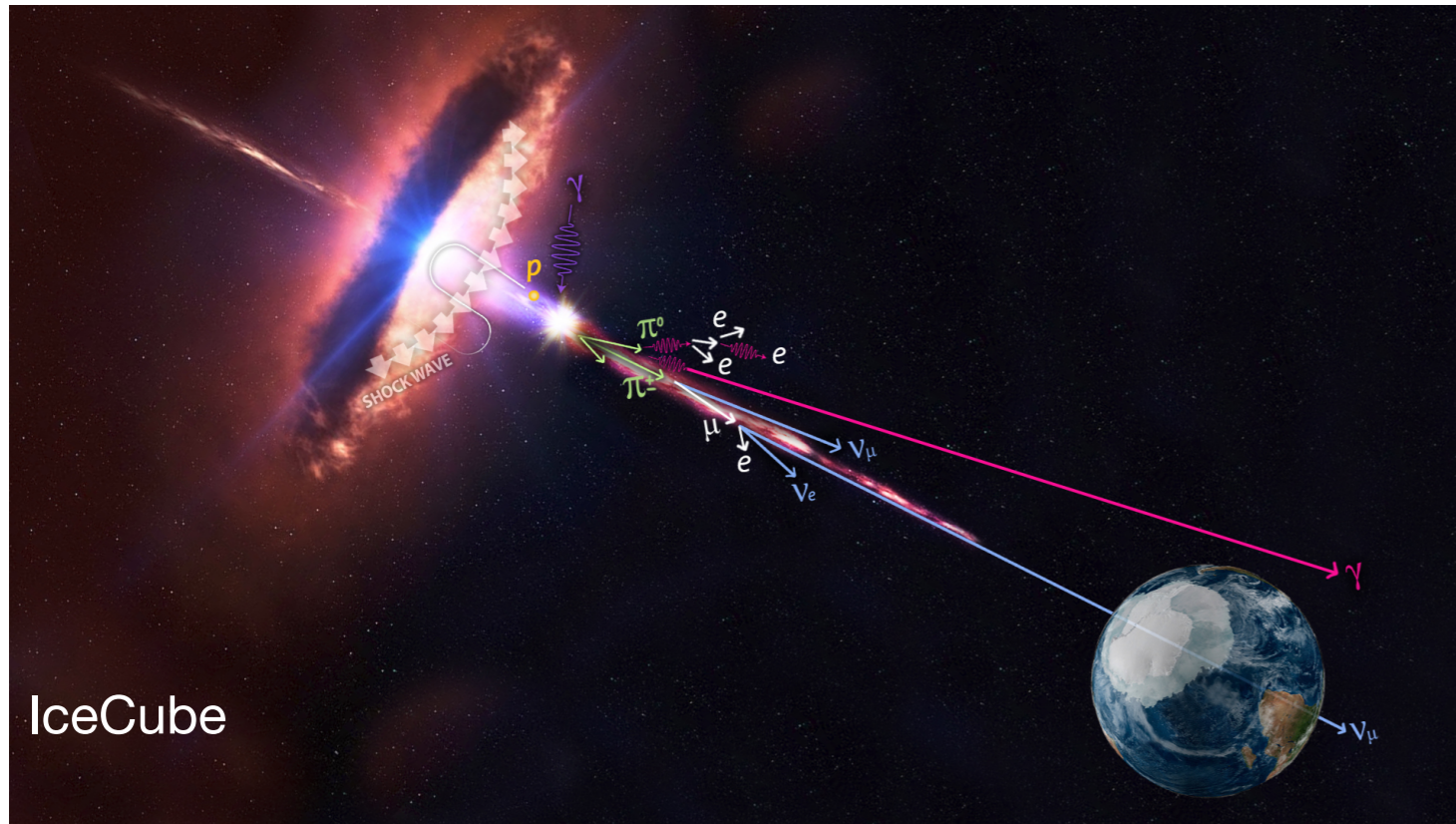


# Searching for Sources of Astrophysical Neutrinos: A Multimessenger Approach

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IceCube Bootcamp  
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# Motivation



At the source

Gamma-ray flux

Neutrino flux

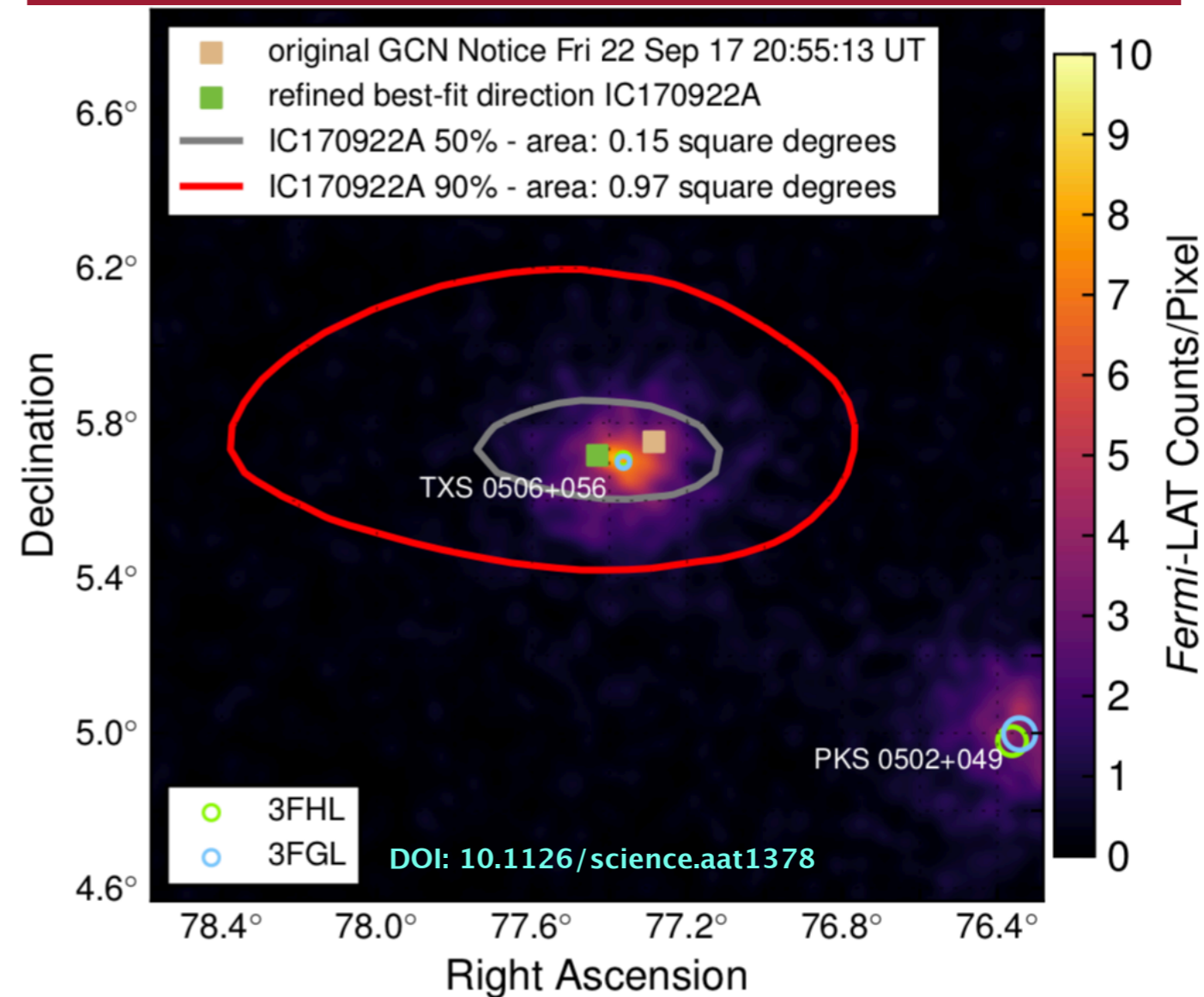
$$\frac{K_{\pi}}{4} E_{\gamma}^2 F_{\gamma}(E_{\gamma}) \approx \frac{1}{3} \sum E_{\nu}^2 F_{\nu}(E_{\nu})$$

**But what are the sources of high energy neutrinos?**

# Motivation

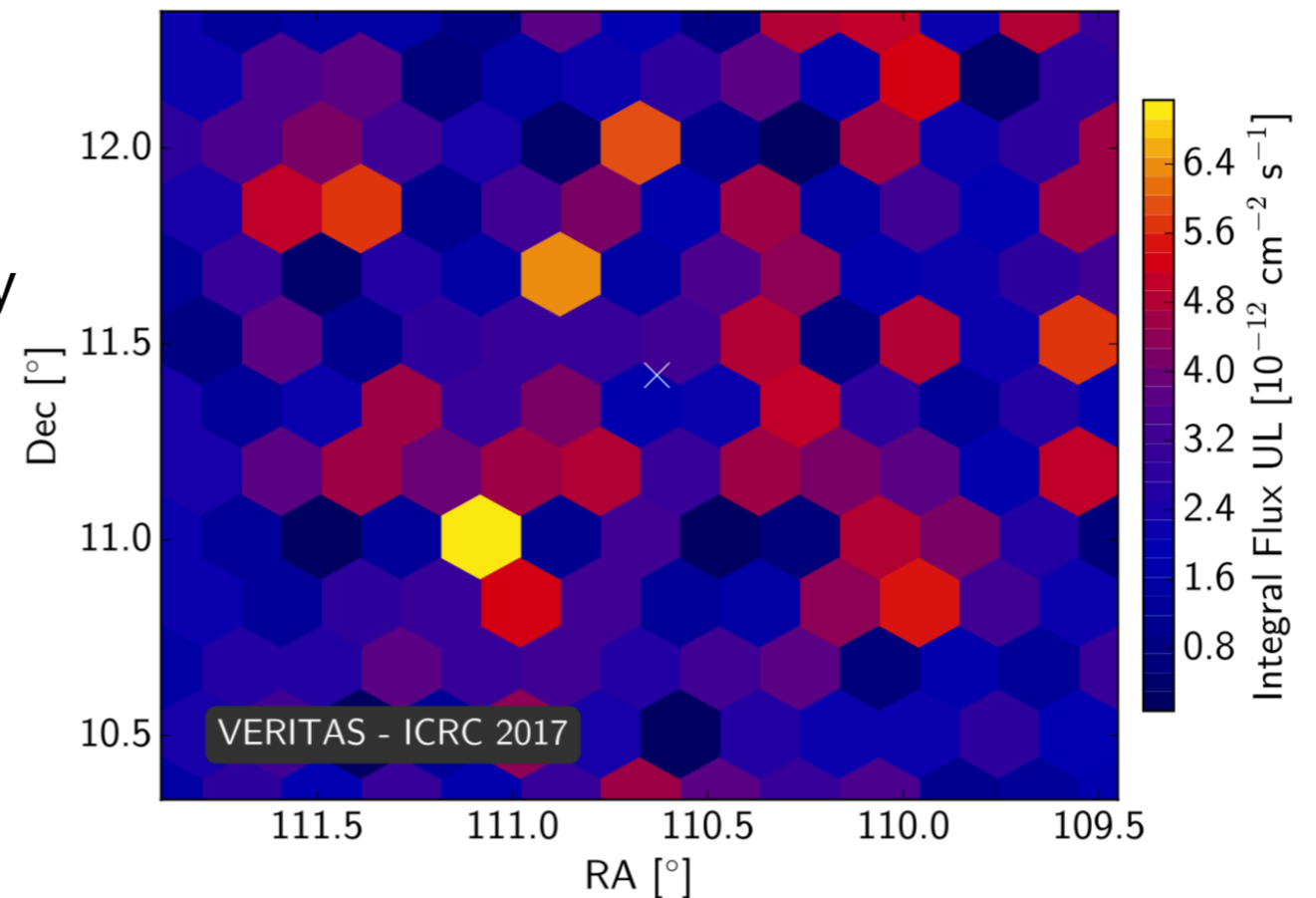
TXS 0506+056 is the only known neutrino source candidate

Multi-messenger observations of a flaring blazar coincident with high-energy neutrino  
IceCube-170922A



# Previous Work

- Search for hadronic gamma-ray emission at the position of neutrinos with VERITAS
- No point sources detected
  - Set upper limits on the gamma-ray flux
- Produce a gamma-ray flux upper limit map
  - Set constraints on any nearby source within the neutrino position's uncertainty region that can be postulated as a counterpart for the neutrino



# Current / Future projects

## Current:

- Select HE photons with Fermi LAT coincident with IceCube neutrino event positions
  - Always on
  - Scans the entire sky

## Future:

- Optimization of energy thresholds for fermi photons
- Detailed angular reconstruction of muon neutrino events for point source searches

# Questions?