

2021—2022 ASTROPHYSICS SEMINAR SERIES

## Gargantua of the Cosmos: Jetted Outflows, Neutrino Emission, and Supermassive Black Holes

Supermassive black holes at the centers of distant galaxies represent some of the most powerful particle accelerators in the universe, and are capable of launching highly relativistic plasma jets at near light speeds out to distances of several million light years. Recent observations suggest that these jets are massive neutrino factories, with measured energies of up to several PeV. Despite their  $\sim$ billion light year distances, it is possible to make high-resolution time lapse movies of extragalactic jets using continent-scale radio interferometer arrays. I will discuss recent results from a long term radio imaging program (MOJAVE), which is regularly observing the brightest jets in the northern sky with the Very Long Baseline Array. Our study seeks to learn why only a handful of jets so far have been seen as neutrino emitters, and to better understand how jet flows are organized and accelerated on scales within a few hundred light years of the black hole. MOJAVE has also made interesting discoveries regarding high energy gamma-ray emission from very recently launched jets, and found evidence of jet nozzles that oscillate over time. I will discuss the latter and its relevance to the MOJAVE jet PKS 2131-021, recently discovered to be a close-orbit supermassive black hole binary system that is predicted to undergo a spectacular merger roughly 10,000 years from now.

**Monday, April 11th**

3:30 - 4:30 p.m.

725 Commonwealth Ave | Room 502

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