

Abstract Submitted  
for the NEF21 Meeting of  
The American Physical Society

**X-raying the Sub-lightyear Environment of Supermassive Black Holes** MISLAV BALOKOVIC, MEG URRY, Yale University, SAMATHA CABRAL, University of Massachusetts Boston, LAURA BRENNEMAN, Center for Astrophysics — Harvard Smithsonian, TRISTAN WEAVER, Yale University — The innermost environment of supermassive black holes (SMBH) are often hidden from our view by the gas and dust surrounding it on larger spatial scales. They are too small in terms of angular size on the sky to resolve with nearly any modern telescope. However, the X-ray radiation produced in the immediate vicinity of the SMBH allows us to probe the larger-scale components shaped by the tenuous balance between inflows and outflows of matter. Recent studies of active galactic nuclei (AGN) in the nearby universe placed interesting constraints on the geometry of these systems using X-ray data. The percentage of sightlines to the SMBH covered by significant amounts of gas was found to non-monotonically depend on luminosity. We are further probing this relationship using self-consistent multi-epoch spectral analyses, which we will demonstrate using new X-ray data on a high-luminosity quasar and a low-luminosity AGN. In the latter case we find a uniform, nearly spherical, low-density distribution of gas on sub-lightyear scales, similar to recent results for other low-luminosity AGN. We will also show how very long baseline interferometry measurements can inform building of new X-ray spectral models for angularly unresolved signatures of the SMBH environment geometry in the X-ray band.

Mislav Balokovic  
Yale University

Date submitted: 21 Oct 2021

Electronic form version 1.4