

**Molecular absorption line study in obscured AGNs**  
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**Abstract**

The formation of relativistic jets in supermassive black holes (SMBHs) and the role of jets in galaxy evolution are the most pressing questions in the field of modern astrophysics. Regarding these issues, surrounding materials of a SMBH are supposed to be a key element to understand the processes of jet formation, propagation, and cessation. However, their detailed roles and properties are still unknown. To unveil physical properties of the ambient gas related with active galactic nuclei (AGN) fueling and feedback, we have conducted an advanced molecular absorption study at millimeter wavelengths. Molecular absorption lines coming from AGN enable us to scrutinize the immediate vicinity of a SMBH by constraining physical parameters of ambient molecular gas. Indeed, absorption lines are detectable regardless of their distance and can be imaged in detail through interferometric observations. By taking advantages of absorption lines, we aim to detect new absorption systems at different redshifts and image absorbing gas around SMBHs by using very long baseline interferometer (VLBI) and large single-dish radio telescopes, which provide unprecedented angular resolutions and sensitivities. This will help to clarify origins of the absorbing matter and reveal a mutual relationship between ambient gas and AGN activity. In this poster, we present main scientific goals of this project and preliminary results.

**Keywords:** *Active galactic nuclei, supermassive black hole, molecular line, mm-VLBI, Radio astronomy,*