

S03b

Extremely high-velocity inflow of SiO onto the radio galaxy NGC 1052

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To investigate physical condition of accretion matter onto AGN, we conducted ALMA observations of a nearby radio galaxy, NGC 1052. This source emanates a twin sub-luminal jet (Kadler+2004) and harbors a dense plasma torus discovered via free-free absorption (Kameno+2001) and dense molecular gas that exhibits H₂O maser (Claussen+1998; Sawada-Satoh+2008) and absorption lines (Liszt+2004; Impellizzeri+2008). With a 0".2 (20-pc) resolution, continuum emission was detected as a point-like source. We detected clear CO ($J = 1 - 2$), SiO ($J = 4 - 5$, $v = 0$ and 1) absorption lines toward the continuum component. The CO absorption profile is fit with $V_{\text{CO}} = 1497 \pm 79 \text{ km s}^{-1}$ (center \pm FWHM/2), which covers the systemic velocity of $V_{\text{sys}} = 1471 \text{ km s}^{-1}$. The CO absorption is considered to represent diffuse molecular gas in the host galaxy. On the other hand, SiO did not reveal any systemic-velocity features. SiO $v = 0$ showed a single redshifted absorption feature of $V_{\text{SiO},0} = 2073^{+115}_{-70} \text{ km s}^{-1}$. Furthermore, SiO $v = 1$ exhibits three absorption components of $V_{\text{SiO},1} = 2008 \pm 71$, 2754 ± 74 , and $3182 \pm 112 \text{ km s}^{-1}$. These absorption features indicate high-velocity (500 – 1800 km s^{-1}) mass inflow with respect to the systemic velocity. The SiO gas could be evaporated from a dust torus irradiated by the central engine. The higher velocity of SiO than those of H₂O maser and OH absorption implies inflow stream from the torus to the central engine.