Molecular Absorption Lines in the Circumnuclear Region

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High angular resolution studies of molecular gas in the center of the extragalaxies (< 1 kpc) have been obtained with millimeter interferometers. The size of the circumnuclear torus, however, is smaller than 10pc, and a milliarcsecond (mas) resolution is required to study its internal structure in nearby AGNs. VLBI observations have revealed the parsec- or subparsec-scale morphology of nearby AGNs. Although thermal emission lines from molecular gas are not luminous enough to detect with the VLBI, VLBI maps can display thermal absorption lines of the gas in silhouette against a bright background synchrotron radiation source with a mas resolution. We present the first VLBI detection of HCN molecular absorption in the nearby AGN NGC 1052. The absorption features are localized on the receding jet side, where the free-free absorption occurred due to the circumnuclear torus.