R21a ALMA Resolves the Circumnuclear Disk of NGC 1808 in [CI] (1-0)

Dragan Salak, Naomasa Nakai, Masumichi Seta (Kwansei Gakuin University), and Yusuke Miyamoto (NAOJ)

Recently, the fine-structure line of atomic carbon [CI] (J=1-0) at 492 GHz has been considered as a potential probe of molecular gas mass, especially in cosmic-ray irradiated molecular clouds and galactic superwinds, where CO may be depleted. In order to understand the origin of [CI] emission in such environments, which include starbursts and active galactic nuclei, it is important to study its distribution, intensity, and relation with other tracers of molecular gas in well-resolved nearby galaxies. Toward this goal, we have used Atacama Large Millimeter/submillimter Array (ALMA) to image molecular lines, such as CO J=1-0, 2-1, and 3-2, mm/sub-mm continuum, and [CI] (1-0) at high resolution (25-50 pc) in the nearby (10 Mpc) starburst/Seyfert galaxy NGC 1808. The galaxy has been the subject of our ALMA observations primarily because of its dusty superwind (Salak et al. 2016, 2017). In this talk, we present initial results of cycle 5 imaging of [CI] (1-0) and 490 GHz continuum at $0.5''$ ($\sim$ 25 pc) resolution, as well as the first images of ^{12}CO, ^{13}CO, C^{18}O (2-1), CS (5-4), and HNCO ($10_{0,10} - 9_{0,9}$) at $1''$ toward the central 1 kpc of NGC 1808. [CI] in the circumnuclear disk (CND; central 100 pc) is distributed in a double peak and a spiral pattern that emerges from the core. Although similar to the distribution of the widespread molecular gas traced by CO, the intensity of [CI] in the central 1 kpc exhibits variations by a factor of a few compared to the dense gas tracers and continuum. The kinematics of [CI] resembles that of CO, showing large ($\sim$ 50 km s^{-1}) noncircular velocities in and around the CND.