R03a **Ionized gas properties in the starburst region of NGC 253 uncovered by ALMA high spatial resolution millimeter observations**

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Radio recombination line observation is the optimal way to investigate ionized gas in starburst galaxies. The emission lines suffer much less interstellar extinction than those in optical and near-infrared wavelengths. However, limited numbers of radio recombination line observations in short millimeter and sub-millimeter wavebands have been performed until recently. That is mainly because their intrinsic intensities are much weaker than those in shorter wavelength. Nowadays, millimeter and sub-millimeter recombination lines can be observed with high sensitivity and high spatial resolution thanks to ALMA's superb sensitivity.

ALMA observations of hydrogen recombination line (H30α) toward a nearby starburst galaxy NGC 253 were carried out with unprecedented high spatial resolution (10 pc). The ionized gas in the galaxy center staburst region is resolved into individual clumps, and they are thought to be accompanied by young massive-star clusters. By combining with archival data of millimeter wave (3-mm) continuum emission, the physical properties of ionized gas are estimated, and it turns out that the electron density and emission measure are similar to or even higher than those of Galactic Compact and Ultracompact HII regions. The continuum and recombination line emission fluxes indicate that the clumps contain up to one hundred O-type stars, and this suggests the clumps are aborning and/or infant super stellar clusters which are embedded in dense ionized gas.