

R12b

## Millimeter Hydrogen Recombination Line in the Center of NGC 253

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Hydrogen recombination line is a fundamental probe to look into properties of ionized gas in galaxies. In particular, recombination lines in millimeter and sub-millimeter wavebands are suitable tool to investigate ionized gas in starburst region because they suffer much less interstellar extinction than those at optical and near-infrared. Recombination lines in mm/sub-mm are intrinsically weaker than those in optical/near-infrared and limited numbers of observations have been conducted. Now, ALMA's superb sensitivity make it possible to carry out mm/sub-mm recombination line observations toward galaxies in reasonable time.

ALMA data of a hydrogen recombination emission line ( $H40\alpha$  at 99 GHz) toward NGC 253 was analyzed. NGC 253 is one of the best studied starburst galaxy in the nearby universe. The  $H40\alpha$  emission from NGC 253 was successfully imaged in the central region of the galaxy with a spatial resolution of few dozens of parsecs. By utilizing flux ratio of free-free continuum emission to  $H40\alpha$ , electron temperature distribution was estimated. Electron temperatures were estimated to be between 6500 and 9000 K. It turned out ionized gas velocity field at the galaxy center considerably differ from that of molecular gas. The velocity field suggests existence of outflowing ionized gas.