

**B20a Ionized gas observation toward a nearby starburst galaxy NGC 253**

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Hydrogen recombination line is a fundamental probe to look into properties of ionized gas. In particular, radio recombination lines are suitable tool to investigate ionized gas in starburst region because they suffer much less interstellar extinction than those at optical and near-infrared. However, limited numbers of radio recombination lines observations toward starburst galaxies, especially those at millimeter and sub-millimeter wavebands, have been conducted so far. That is mainly because their intensity is relatively weaker than those of recombination lines at shorter wavelength. Nowadays, millimeter and sub-millimeter recombination line observations toward galaxies can be carried out in a reasonable time thanks to ALMA's superb sensitivity.

ALMA observations of a hydrogen recombination emission line ( $H40\alpha$ ) toward NGC 253 were performed in the Early Science Cycle 0. NGC 253 is a prototypical starburst galaxy at the nearby universe. The recombination line was clearly detected in the central region of NGC 253 with a spatial resolution of  $36 \times 24$  pc at the galaxy. The line and thermal free-free continuum emission show quite similar spatial distribution. This fact shows that the recombination line certainly trace ionized gas around massive stars. Recombination line to free-free continuum flux ratio enable us to estimate ionized gas electron temperature to be between 8500 and 11000 Kelvin, which is within a range of that of typical HII regions.