

Q09a Precise measurement of line intensities and frequencies of CH₃OH in the ALMA Band 7 by using emission-type millimeter and submillimeter-wave spectrometer SUMIRE

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Thanks to the recent development of the radio observation technique, the spectral lines of various interstellar molecules can be observed with high sensitivity. As a result, since a huge number of molecular lines are detected including unidentified lines, it makes the astronomical analysis more complex. Those lines are considered to be due to minor isotopologues and/or low-lying vibrational states of major interstellar molecules such as methanol (CH₃OH). However, the laboratory-based spectroscopic measurements and theoretical estimations of the intensities as well as frequencies are insufficient for those molecules. To solve the issue, it is crucial to carry out highly accurate measurements of the line intensities and frequencies for those molecules in laboratory. In this study, the line frequency and intensities of CH₃OH have been determined in the ALMA Band 7 from 294 GHz to 364 GHz by newly installed receiver on the SUMIRE (Spectrometer Using superconductor MIXer REceiver: Watanabe et al. 2021, PASJ, 73, 372). As reported in the previous measurement in ALMA Band 6, there is a discrepancy between the measured and calculated frequencies as J increased.