

X26b 遠赤外線輝線を狙ったブラインド探査で探る遠方星形成史

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Using blind line searches to understand the cosmic star-formation history is one of the strategies that will be pursued by next-generation millimetre/sub-millimetre single-dish telescopes which will have high sensitivity and mapping speed. Before moving into such a new era, it is essential to develop a method to efficiently detect faint line-emitting sources whilst considering the completeness of source detection and contamination by false detections. Furthermore, in order to propose robust strategies for blind line searching, it is necessary to know to what extent we can constrain the luminosity function using existing ALMA archival data.

In this presentation, we report the current status of tests using a blind line-searching method and show preliminary results using ALMA archival data. We discuss the detectability of line-emitting sources with various properties, e.g. peak flux, line width and spatial size, by injecting artificial sources into the ALMA data. To be as realistic as possible, this is done in the visibility plane, and we also investigate the effect of non-Gaussian noise. We compare the performance of methods developed by the members of this project.

We plan to apply our final results to various science cases for future observations, e.g. cross-checking the luminosity density using an intensity-mapping technique or estimating the redshift evolution of ionisation state or metallicity by combining with JWST or SPICA data. We plan to release our code as a CASA task.