

‘Ala‘ihi 3-mm Receiver Commissioning on JCMT: OMC-1 Raster Mapping of SO, SiO, and C₂H

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We report on commissioning observations of ‘Ala‘ihi, the 86 GHz insert receiver on the Nāmakānui heterodyne instrument, on the James Clerk Maxwell Telescope (JCMT), using raster mapping of the BN/KL region in OMC-1 as a test field. ‘Ala‘ihi is one of three interchangeable receiver cartridges (along with ‘Ū‘ū at 230 GHz and ‘Āweoweo at 345 GHz) housed in a single dewar, enabling multi-band spectral line observations. Our commissioning observations used two ACSIS subsystems: SS1 with 1 GHz bandwidth around 86 GHz to cover the SO and SiO lines, including the strong SiO $v=1$ transition, and SS2 with 250 MHz bandwidth to resolve the five hyperfine components of C₂H. We conducted an approximately $8' \times 8'$ on-the-fly map during daytime under moderate weather conditions, and combined multiple raster scans to evaluate the instrument performance and stability.

From SS1 data, we derive integrated intensity and velocity maps for SO and SiO, revealing the outflow structure and kinematics in OMC-1, and use the two polarizations to check instrumental reproducibility. From SS2, we obtain C₂H moment maps and estimate optical depths from the hyperfine ratios. The good agreement between the two polarizations and the successful co-addition of repeated raster scans demonstrate that ‘Ala‘ihi delivers stable, repeatable spectra and scientifically useful line maps even in daytime commissioning observations. These results highlight its potential for efficient multi-line studies of star-forming regions and other molecular targets. In this presentation, we will summarize these commissioning results and discuss future science opportunities with ‘Ala‘ihi.