

Development of a new wideband heterodyne receiver system (RF: 210–375 GHz, IF: 4–21 GHz) for the Osaka 1.85-mm mm-submm telescope

We report the development of a wideband receiver system using a corrugated horn covering 210–375 GHz (56% fractional bandwidth; Yamasaki et al. 2021, PASJ), wideband waveguide multiplexers (Masui et al. 2021, PASJ), and a wideband SIS-mixer with an IF (intermediate frequency) output of 4–21 GHz (Kojima et al. 2020, A&A). In the system, the RF signal from the horn is divided into two frequency bands by a wideband diplexer with a fractional bandwidth of 56%, and then each frequency band is further divided into two bands by each diplexer. One of the SIS-mixers connected has a wideband 4–21 GHz intermediate frequency (IF) output. This receiver system has been installed on the 1.85 m telescope of Osaka Prefecture University located at the Nobeyama Radio Observatory. We succeeded in simultaneous observations of six CO isotopologue lines with the transitions of $J = 2-1$ and $J = 3-2$ toward the Orion KL as well as on-the-fly mappings toward the Orion KL and W 51 with the developed system.

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