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■ Title

Far-infrared nebular emission lines and physics of the interstellar medium of star-forming galaxies in the reionization epoch

■ Summary

Physics of the interstellar medium (ISM) of star-forming galaxies in the reionization epoch is essential to understanding the galaxy formation and evolution and cosmic reionization. We observed the [OIII] 88 micron line and the [CII] 158 micron line of a  $z=7.2$  Ly-alpha emitter with ALMA and obtained a very high [OIII]-to-[CII] line ratio. This indicates a deficiency of the HI gas in the ISM of the galaxy and a high escape fraction of ionizing photons. The metallicity in the ISM of the galaxy was estimated at 10--100% of the Sun from the [OIII] line luminosity and the spectral energy distribution modeling. In this research project, we intend to verify universality of such high [OIII]-to-[CII] ratio, metallicity and escape fraction among star-forming galaxies in the reionization era found with the Hubble Space Telescope and the Subaru telescope by observing them with ALMA. Then, we clarify the contribution of these galaxies to cosmic reionization. Furthermore, we investigate kinematics in the ISM of the high- $z$  galaxies with the [OIII] line.