

The End of the Reionization Epoch Probed by Ly α Emitters at $z = 6.5$

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Abstract

We report an extensive search for Lyman α emitters (LAEs) at $z = 6.5$ in the Subaru Deep Field. Subsequent spectroscopy with Subaru/Keck identified eight more LAEs, giving a total of 17 spectroscopically confirmed LAEs at $z = 6.5$. Based on this spectroscopic sample of 17, complemented by a photometric sample of 58 LAEs, we have derived a more accurate Ly α luminosity function of LAEs at $z = 6.5$, which reveals an apparent deficit at the bright end, of ~ 0.75 mag fainter L^* , compared with that observed at $z = 5.7$. The difference in the LAE luminosity functions between $z = 5.7$ and $z = 6.5$ is significant at the 3σ level, which is reduced to 2σ when cosmic variance is taken into account. This result may imply that the reionization of the universe has not been completed at $z = 6.5$. We found that the spatial distribution of LAEs at $z = 6.5$ was homogeneous over the field. We discuss the implications of these results for the reionization of the universe.