MUSE integral-field spectroscopy towards the Frontier Fields Cluster Abell S1063

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Abstract

I will present the first observations taken with the newly installed VLT integral field spectrograph Multi Unit Spectroscopic Explorer (MUSE) on one of the Frontier Fields Clusters, Abell S1063. Because of the relatively large field of view of MUSE (1 arcmin^2), MUSE is very good to simultaneously target multiple background galaxies in blank and cluster fields over the full optical spectrum. MUSE has a relatively high spatial (0.2") and spectral resolution (1.25 Å), preventing source confusion and allowing for detailed spectral line analysis. We have reduced the four hours of data obtained in the Science Verification phase on this cluster, and determined redshifts for 53 galaxies in the field. We confirm the redshift of 5 cluster galaxies, and determine the redshift of 29 other cluster galaxies, and show the distribution of active and passive galaxies in this cluster. Behind the cluster, we find 17 individual galaxies at higher redshift, including three previously unknown Lyman-α emitters at $z > 3$, and 5 multiply lensed galaxies. We find C III], C IV, and He II emission in a multiply lensed galaxy at $z = 3.116$, indicating the presence of an active galactic nucleus. Furthermore, we show the possibilities of MUSE for obtaining detailed velocity maps of cluster members and background galaxies. All of these properties show that with MUSE one can very efficiently observe towards clusters and obtain both a mass model for the cluster and perform a blind search for high redshift galaxies.