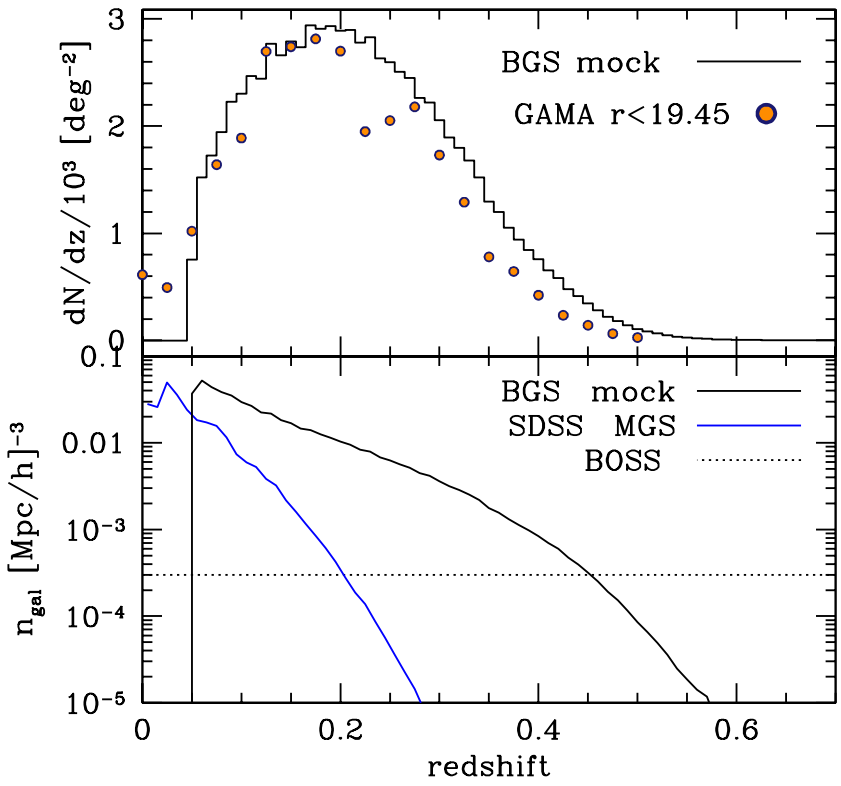

Figure 3.2: *Upper panel*: The redshift distribution of the mock BGS sample. The distribution peaks at $z = 0.18$ with a median redshift of $z = 0.204$. *Lower panel:* The space density of BGS galaxies as a function of redshift. For comparison, the space density of the MGS is shown with the blue curve, and the approximate space density of the full BOSS LRG sample (LOWZ+CMASS) is shown with the dotted line. The space density of the BGS sample is larger than the MGS+BOSS samples up to $z \sim 0.4$.

$(\mathrm{Mpc}/h)^{-3}$. For reference, the space density of the MGS is shown, as well as the density of BOSS LOWZ+CMASS objects, which is roughly constant at 3×10^{-4} $(\mathrm{Mpc}/h)^{-3}$. The BGS sample has a significantly higher density than either the MGS or BOSS out to a redshift of $z = 0.4$. At $z = 0.3$, the sampling of the density field is over an over of magnitude higher in the BGS than in the sum of all SDSS targets.

Redshift measurement method

As a simple flux-limited sample, the BGS will target both star-forming and quiescent galaxies. Redshifts will be obtained from template fits over the full DESI spectral range, with the significance of the fits dominated by the emission lines for star-forming galaxies and by the 4000Å break and Mg absorption features for quiescent galaxies. Figure 3.3 shows the redshift efficiency as a function of both exposure time and lunar phase for a test sample of galaxies. The test sample is constructed by taking random MGS galaxies and 'moving' them further away from the observer by a factor of 2 in redshift. Because the median redshift of the MGS is $z \sim 0.1$, this process creates a test sample with the same median redshift as the BGS sample. We take into account the change in the fraction of light from the galaxy that enters the fiber aperture through redshifting, the change in the angular diameter distance, the change in the point spread function from SDSS to DESI, and the different fiber diameters. `desi_quicksim` is used to create DESI spectra for each test galaxy