## R41a The Morphology-Density Relation in the SDSS

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We have studied the morphology-density relation and morphology-cluster-centric-radius relation using a volume limited sample (0.05<z<0.1,$Mr$ <-20.5) of the Sloan Digital Sky Survey (SDSS) data. We found there are two characteristic changes in both the morphology-density and the morphology-radius relations, suggesting two different mechanisms are responsible for the relations. In the sparsest regions (below 2 $Mpc^{-2}$ or outside of 2 virial radius), both relations become less noticeable, suggesting the responsible physical mechanisms for galaxy morphological change require denser environment. In the intermediate density regions, (density between 2 and 6 $Mpc^{-2}$ or virial radius between 0.3 and 2), S0 fractions increase toward denser regions, whereas late-spiral fractions decrease. We propose that the mechanism is likely to stop star formation in late-spiral galaxies, eventually turning them into S0s after their outer discs and spiral arms become invisible as young stars die. In the densest regions (above 6 $Mpc^{-2}$ or inside of 0.3 virial radius), S0 fractions decrease radically and elliptical fractions increase in turn, suggesting yet another mechanism is responsible for morphological change in these regions. One of the candidate mechanisms is merging scenario, where merging of S0 galaxies creates larger elliptical galaxies. We also compared the morphology-density relation from the SDSS (0.05<z<0.1) with that of the MORPHS data (z∼0.5). Two relations lie on top of each other, suggesting that the morphology-density relation was already established at z∼0.5 as is in the present universe.