THEORETICAL AND OBSERVATIONAL IMPLICATIONS OF A SUPER-HORIZON-SCALE INHOMOGENEOUS COSMOLOGICAL MODEL

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1. Introduction and summary

We discuss the theoretical and observational implications of an inhomogeneous cosmological model consisting of three regions: the inner low-density homogeneous region, the self-similar (or partially similar) inhomogeneous region and the outer nearly flat homogeneous region. When we assume Einstein's gravitational theory without cosmological constant, the standard inflation theory, and the observational fact of local low density around us, this model is found to be reasonable. The boundary between the inner region and the self-similar region is assumed to be in a spherical shell corresponding to the epoch of redshift $z = 1.5 - 2.0$, when the numbers of QSOs and Ly α clouds changed rapidly.

First we consider the theoretical structure of the model and its observational aspect, especially the redshift dependence of various observational quantities, such as the Hubble parameter, number densities, the angular and luminosity distances. Next we discuss structure formation in this model and the number density evolution of QSOs in connection with the rapid change in the density at the boundary ($z = 1.5 - 2.0$).

2. References

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