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Effects of structure formation on the apparent expansion rate of the universe[1] XINGHAI ZHAO, GRANT MATHEWS, IN-SAENG SUH, University of Notre Dame — There are recent claims that back-reaction terms arise when the effective Friedmann equation is averaged over a spatial volume in a locally inhomogeneous cosmology. These terms are claimed to lead to a new average expansion rate of the universe. Many analytical methods for this averaging procedure have been proposed and investigated. In this talk, we discuss a numerical simulation approach in which we have derived a scheme to include general relativistic corrections for general three dimensional inhomogeneities in space. The volume averaged expansion rate is quantitatively calculated with an N-body simulation code for a matter dominated, structure forming era. We discuss current limits on the corrections to the standard expansion rate. The possible physical nature of the corrections and the impacts of this averaging on the cosmological observables will also be addressed.

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