General Relativity and Quantum Cosmology

Coarse-graining of inhomogeneous dust flow in General Relativity via isometric embeddings

Mikolaj Korzynski

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We present a new approach to coarse-graining of variables describing dust flow in GR. It is based on assigning quasi-local shear, twist and expansion to 2-dimensional surfaces with the help of isometric embeddings into the 3-dimensional Euclidean space and deriving the time evolution equations for them. In contrast to the popular Buchert's scheme it allows to coarse-grain tensorial quantities in a coordinate-independent way. The framework can be used to estimate backreaction in inhomogeneous cosmological models.

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