

# Cosmological zoom-in simulations with stereographic projection

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Cosmological N-body simulations are used to calculate the matter distribution in a model Universe at the nonlinear regime. These simulations have high-performance computing requirements, especially when fine resolution is needed. Cosmological "zoom-in" simulations aim to alleviate this need by calculating the matter distribution with variable spatial resolution. Typically, these simulations calculate a "region of interest" with high resolution, and the rest of the volume at lower resolution. Standard cosmological zoom-in simulations use periodic boundary conditions to take the matter distribution outside the simulation volume into account. These simulations are not isotropic due to the broken symmetry introduced by the boundary conditions. We present a new simulation method that is capable of calculating the dark matter distribution in a large spherical volume with decreasing resolution in radial direction and without using periodic boundary conditions.