

Structure formation in the Universe

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The structure we see in the universe today formed under the force of gravity out of small, approximately Gaussian and adiabatic perturbations in the early universe. In these lectures, I will cover how cold, pressureless matter evolves under gravity in an expanding universe, including analytical and numerical techniques for solving this nonlinear problem. A further important issue to be covered is how we can incorporate the effect of small-scale baryonic (non-gravitational) physics into our predictions. With these solutions in hand, we can then predict the most important observables of large-scale structure: galaxy clustering, weak gravitational lensing, and the abundance of galaxy clusters, among others.

Reference: Ch. 11-13 of <https://www.elsevier.com/books/modern-cosmology/dodelson/978-0-12-815948-4>