

Outline

Part II. Structure Formation: Dark Matter

5. Linear growth of fluctuations by gravitational Instability
6. Statistics of fluctuations: initial fluctuations and the cold-dark-matter scenario
7. Nonlinear growth of structure: spherical collapse, virial equilibrium, Zeldovich approximation and the cosmic web, N-body simulations
8. Hierarchical clustering: Press-Schechter halo distribution, EPS merger trees, galaxy/halo biasing, HOD and correlation function
9. Dark-matter halos: universal profile, the cusp/core problem, dynamical friction, tidal effects, halo shape
10. Substructure of dark-matter halos, phase-space density

Outline cont.

Part III. Galaxy Formation: Including gas and Stars

11. Angular momentum: tidal-torque theory, halo spin, disk formation, the AM problem
12. Galaxy bimodality: observations, virial shock heating, star formation and quenching mechanisms, downsizing
13. Dwarf galaxies and supernova feedback
14. Formation of elliptical galaxies by mergers: missing dark matter? origin of scaling relations, origin of red sequence and downsizing
15. Galaxy formation at high redshift: cold streams, clumpy disks and compact spheroids
16. Massive black holes in galaxies: AGN feedback
17. Semi-analytic modeling of galaxy formation