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Nota di contenuto	Preface; Contents; 1. Non-linear gravitational clustering in an expanding universe Jasjeet Singh Bagla; 1.1 Introduction; 1.2 Gravitational clustering; 1.2.1 Linear approximation; 1.2.2 Quasi-linear approximations; 1.3 In search of universalities; 1.3.1 Mode coupling: Effect of small scale perturbations; 1.3.2 Mode coupling: Effect of large scale perturbations; 1.4 Conclusions; Acknowledgments; References; 2. Dark ages and cosmic reionization Tirthankar Roy Choudhury; 2.1 Introduction; 2.2 Theoretical formalism; 2.2.1 Cosmological radiation transfer; 2.2.2 Post-reionization epoch 2.2.2.1 Resonant Lyman series absorption2.2.2.2 Continuum absorption; 2.2.3 Pre-overlap epoch; 2.2.4 Reionization of the inhomogeneous IGM; 2.3 Modelling of reionization; 2.3.1 Reionization sources; 2.3.1.1 Mass function of collapsed haloes; 2.3.1.2 Star formation rate; 2.3.1.3 Production of ionizing photons; 2.3.1.4 Feedback processes; 2.3.1.5 Quasars; 2.3.2 Illustration of a semi-analytical model; 2.4 Current status and future; 2.4.1 Simulations; 2.4.2 Various observational probes; 2.4.2.1 Absorption spectra of high redshift sources; 2.4.2.2 CMBR observations; 2.4.2.3 Ly emitters 2.4.2.4 Sources of reionization2.4.2.5 21cm observations; 2.5

Concluding remarks; References; 3. Probing fundamental constant evolution with redshifted spectral lines Nissim Kanekar; 3.1 Introduction; 3.2 Redshifted spectral lines: Background; 3.3 Optical techniques; 3.3.1 The alkali doublet method; 3.3.2 The many-multiplet method; 3.3.3 Molecular hydrogen lines; 3.4 "Radio" techniques; 3.4.1 Radio-optical comparisons; 3.4.2 Radio comparisons; 3.4.3 Ammonia inversion transitions; 3.5 "Conjugate" Satellite OH lines; 3.6 Results from the different techniques; 3.7 Future studies; 3.8 Summary
3.9 AcknowledgmentsReferences; 4. Averaging the inhomogeneous universe Aseem Paranjape; 4.1 Introduction; 4.2 History of the averaging problem; 4.2.1 Noonan's averaging scheme; 4.2.2 Futamase's scheme; 4.2.3 Boersma's scheme; 4.2.4 Kasai's scheme; 4.2.5 Conventional wisdom and controversy; 4.3 Buchert's spatial averaging of scalars; 4.4 Zalaletdinov's Macroscopic Gravity (MG); 4.4.1 A spatial averaging limit; 4.5 Backreaction in cosmological perturbation theory; 4.5.1 Lessons from linear theory; 4.5.2 The nonlinear regime; 4.5.2.1 Dimensional arguments, and why they fail
4.5.3 Calculations in an exact model4.6 Conclusions; 4.6.1 The "Special Observer" assumption; References; 5. Signals of cosmic magnetic fields from the cosmic microwave background radiation T. R. Seshadri; 5.1 Introduction; 5.2 Origin of CMBR; 5.2.1 Homogeneous universe; 5.3 Origin of CMBR and the homogeneity of the universe; 5.4 Finer features of the CMBR: A brief introduction; 5.4.1 Temperature anisotropy; 5.5 Origin of temperature anisotropy in the CMBR; 5.6 Characterizing the nature of CMBR polarization anisotropy; 5.7 Origin of CMBR polarization anisotropy; 5.8 Cosmic magnetic fields
5.9 Polarization in CMBR due to magnetic fields

Sommario/riassunto

This book comprises expository articles on different aspects of gravitation and cosmology that are aimed at graduate students. The topics discussed are of contemporary interest assuming only an elementary introduction to gravitation and cosmology. The presentations are to a certain extent pedagogical in nature, and the material developed is not usually found in sufficient detail in recent textbooks in these areas.