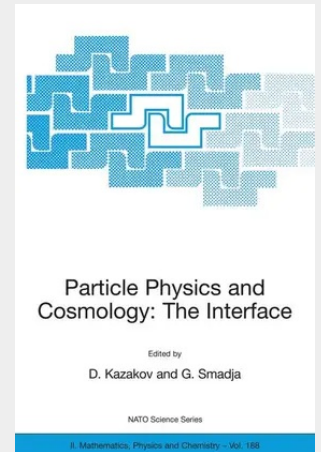


Particle Physics and Cosmology: The Interface

Proceedings of the NATO Advanced Study Institute on Particle Physics and Cosmology:
The Interface Cargèse, France, 4-16 August 2003

This Cargèse school of Particle physics is meant to bridge the narrowing gap between astrophysical observations and particle physics. The lectures supply the students with a theoretical background which covers several aspects of the cosmological scenario: matter-antimatter asymmetry, the nature of dark matter, the acceleration of the expansion and the cosmological constant and the geometry of the universe as well as interviews on particle physics including supersymmetry, extra dimensions scenarios and neutrino oscillations. ix Preface

The investigation of nuclear abundances by Alpher, Bethe, and Gamow (1948) was the first intrusion of subatomic physics into cosmology. In contrast with their assumption, most nuclear species are now known to be produced in stars, but their bold step led to predictions which have largely been proven to be right: -a crude estimate of the densities during primordial nucleosynthesis -the presence of a residual 3K radiation today. the issues they addressed are still relevant. The origin of matter is not fully understood, and the CMB has grown into a powerful tool to investigate the early eras of the universe. The progress of cosmological observations has now led to a 'standard' slow-roll inflation model, which accounts quantitatively for many observed features of the universe. As the lectures will show, it still leaves large uncharted areas, and the underlying particle physics aspects are yet to be elucidated.



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