

APR20-2020-020047

Abstract for an Invited Paper
for the APR20 Meeting of
the American Physical Society

Exploring the Universe

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The CDM cosmology passes a network of tests that is tight enough for a compelling case that this theory is a good approximation to what happened as the universe expanded and cooled. But the CDM theory is incomplete: we have only weak constraints on the nature of the dark matter, the quantum vacuum energy density remains a deep puzzle, and we have ideas but little evidence of what was happening before the universe was expanding. Perhaps anomalies will offer hints to a better theory. That is why the issue of the extragalactic distance scale is greeted with such interest, and why the comparison of the theory and observations of galaxies is of continuing importance. There still are many directions of research to explore about the large-scale nature of the universe.