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Clusters for Cosmology

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Over the past 30 years, cosmologists have made dramatic advances in establishing the fundamental parameters that govern the large-scale evolution of cosmic space-time. This progress is largely the result of experiments designed to measure the properties of the cosmic microwave background (CMB) to exquisite precision. CMB measurements, however, provide information about the state of the Universe when it was $\sim 370,000$ years old. The growth of cosmic structure - such as “clusters of galaxies”, the most massive of the gravitationally bound objects in the universe - provides an alternate probe of the universe, albeit at the more recent epoch. According to the minimal standard model, the two sets of measurements ought to give consistent results. However, recently released results from the Planck mission indicate that the two are in tension. Several resolutions have been proposed, of which the most exciting is that these results indicate the need for new physics. Another possibility is systematics in the “clusters for cosmology” program. Here I will provide a non-specialist overview of what this program entails, and provide recent results from the Canadian Clusters Comparison Project (CCCP).

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