Title:	Constraining Cosmological Parameters using Angular Diameter Distances of Galaxy Clusters
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Abstract:	Galaxy clusters are the most massive astrophysical objects bound by gravity. As the name suggests, these are groups of few tens to up to thousands of galaxies along with the intracluster medium and dark matter. These structures observable in optical, Xray and radio wavelengths. Besides being of astrophysical importance, galaxy clusters prove to be reliable cosmological probes and can be used to understand the expansion history of the Universe, and provide insights into questions such as the nature of cosmic acceleration and growth rate. These are complementary to distance based probes such as Type Ia Supernovae and Baryon Acoustic Oscillations. The distribution of masses and redshift depend on the structures in the universe. Studies have demonstrated that Galaxy clusters using X-ray and Sunyaev Zel'dovich Effect(SZE) observations are potential probes of cosmology. Angular Diameter Distance(ADD) for galaxies derived from these observations are used as distance probes, that can be compared with theoretical models of cosmology and constrain the cosmological parameters. In this thesis, I attempt to constrain the cosmological parameters governing the geometry and evolution of the Universe using galaxy clusters as distance probes and calculating their angular diameter distances using X-ray and SZE observations of different clusters. I will start by introducing different contesting cosmological models for the Universe, then describe the processes responsible for X-ray emission and SZE and the calculation of angular diameter distance from X-ray and SZE observations. I also discuss the mathematical tools required for model selection and lastly, I study the cosmological tests along with the effect of differently modelled morphologies of galaxy clusters on cosmological tests.
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