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Theoretical Overview of Dark Energy

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Recent developments in understanding the influence of dark energy dynamics on cosmological observables have led to several insights in how to reveal the nature of dark energy. This includes the categorization of many physics models for the dark energy into either freezing or thawing behavior, recognition of differences from the inflation scenario, and methods for robustly distinguishing a physical dark energy from a modification of gravitational physics. These have definite consequences for experiment design, such as prescription of the relative precision needed for dynamics measurements, the need for probes of both cosmological expansion and large scale structure growth, and how dark energy microphysics can contribute a theory-induced systematics limit on many techniques.