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Testing Gravity with the Dark Energy Spectroscopic Instrument (DESI) NIKHIL PADMANABHAN, Yale University, DARK ENERGY SPECTROSCOPIC INSTRUMENT (DESI) COLLABORATION — Spectroscopy from the Dark Energy Spectroscopic Instrument will allow us to construct a 3D map of the distribution of matter in the Universe over an area of 14,000 $\deg^2$ and out to a redshift $z < 4$. This will allow precise measurements of the rate at which structure forms in the Universe and therefore, provide a test on our theory of gravity. On large scales, these measurements are enabled by redshift space distortions. I will review both the state of the theory and observations at the start of DESI, the forecasted improvements that DESI will provide, and the challenges to achieving these measurements. I will also discuss opportunities to test gravity on smaller scales and how these might provide complementary information to the large scale tests.

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