

WFIRST and Euclid

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The past decade has seen tremendous progress in astronomy that has brought us to the brink of being able to answer two very fundamental questions: What is the Universe made of? Are we alone?

The first question can only be answered by trying to understand the mysterious "dark energy" causing the accelerated expansion of the Universe. This dark energy, the dominant constituent of the Universe, has a number of possible theoretical explanations, ranging from a cosmological constant, to possible modifications to Einstein's General Theory of Relativity. The second question is motivated by the increasing frequency of detections of exoplanets and can be explored by seeking out the frequency of Earth-like planets in the habitable zone of stars similar to the sun. Both of these science goals can be best explored with a space-based wide-field telescope capable of imaging and spectroscopy. Such a platform, operating in optical to near infrared wavelengths would also make great strides in a myriad of ancillary astrophysical areas, including the evolution of galaxies and structures over two thirds of the age of the Universe. The European Space Agency is in the final stages of examining the Euclid mission, which is optimized to study dark matter and dark energy. NASA has begun planning for the Wide Field Infrared Survey Telescope designed to explore dark energy and perform an exoplanet survey. I'll discuss the scientific motivations of both missions and give an overview of the hardware, observing strategy and status of each mission.