

Webb scope looks out of this world

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The James Webb Space Telescope (JWST), the orbiting infrared observatory designed to succeed the Hubble Space Telescope, is set to enable fundamental breakthroughs in our understanding of the formation and evolution of galaxies, stars and planetary systems. The project is led by NASA, with major contributions from the European and Canadian Space Agencies. The telescope is scheduled for launch in 2013 for a mission of 5-10 years. NASA's Jonathan Gardner and colleagues' comprehensive description of the scientific goals and technical design of the observatory, which can be used by scientists throughout the world in planning for Webb's investigations and discoveries, was recently published in Springer's peer-reviewed journal *Space Science Reviews*.

Lead author Jonathan Gardner, Chief of the Laboratory for Observational Cosmology at NASA's Goddard Space Flight Center, said: "Many of the most important scientific results from Hubble were not anticipated before its launch in 1990. Similarly, while this publication outlines the scientific goals we have for Webb at this time, my hope is that Webb will make additional discoveries that we can't even imagine now."

The JWST, named after a former NASA Administrator, will complement and extend the discoveries of the Hubble Space Telescope, with longer wavelength coverage and greatly improved sensitivity. Webb's instruments will be designed to work primarily in the infrared range of the electromagnetic spectrum, with some capability in the visible range. The longer wavelengths enable JWST to look much closer to the beginning of time and to hunt for the unobserved formation of the

first galaxies, as well as look inside dust clouds where stars and planetary systems are forming today. Webb's scientific goals are split into four distinct themes: The End of the Dark Ages - First Light and Reionization; The Assembly of Galaxies; The Birth of Stars and Protoplanetary Systems; and Planetary Systems and the Origins of Life.

The JWST will be launched on an Ariane 5 Enhanced Capability-A rocket into orbit well beyond Earth's Moon, about 1.5 million km (940,000 miles) from the Earth, at the Second Lagrange Point (L2). At that distance from Earth, the telescope will be protected from stray light and heat, yet will remain in an orbit that makes operations and communications easy. Just as importantly, Earth will not obstruct the telescope's view.

The authors conclude: "Regular, competitive peer-reviewed proposal selection will ensure that this international resource will address the most relevant and strongly justified scientific questions, and will leave a legacy of knowledge and discovery for future generations."

The article is freely accessible online via SpringerLink:
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