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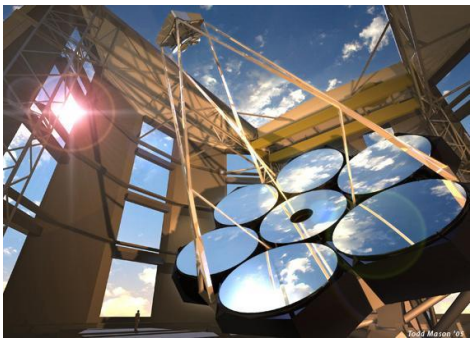
The Giant Magellan Telescope Project

Wendy Freedman (Director, Carnegie Observatories)

Prof. Wendy Freedman is the Crawford H. Greenewalt Chair and Director of The Observatories of the Carnegie Institution of Washington. She is also the chair of the board of directors of the Giant Magellan Telescope (GMT) project. She completed her Ph.D. in Astronomy and Astrophysics at the University of Toronto in 1984. she was a Faculty Member (1987 to 2003) and a Carnegie Fellow (1984-1987) at the Observatories. She was also a Principal Investigator of the Hubble Space Telescope Key Project on the Extragalactic Distance Scale, a project to measure the current expansion rate of the Universe. Dr. Freedman was elected a Member of the National Academy of Sciences in 2003, and to the American Philosopical Society in 2007. She was awarded the American Association of Physic's Teachers Klopsteg Award in 2005, and the Magellanic Prize of the American Philosophical Society in 2002. Dr. Freedman was elected a Fellow of the American Academy of Arts and Sciences in 2000. Dr. Freedman's principal research interests are in observational cosmology. Her current research interests are directed at measuring the past expansion rate of the Universe, and in characterizing the nature of dark energy, which is causing the universe to speed up its expansion.

Abstract



Three international consortia are developing concepts for extremely large telescopes larger than 20m in diameter. One of these, The Giant Magellan Telescope is a 25m aperture comprised of seven 8.4m diameter mirror segments, to be built at Cerro Las Campanas, in the Andes mountains of Chile. The GMT mirror segments are made of borosilicate glass cast in a rotating oven. The seven mirrors will provide a collecting area equivalent to that of a filled aperture 22m in diameter and the angular resolution of a filled 24.5m aperture – ten times that of the Hubble Space Telescope. The first of the primary mirrors has been completed at the Steward Observatory Mirror Laboratory. The surface figure error amounts to only 20 nm rms. The second off-axis mirror has been cast, removed from the oven and cleaned. An adaptive secondary mirror, composed of 3 mm thin face sheets and more than 7000 actuators will correct wavefronts distorted by the Earth’s atmosphere hundreds of times each second, while powerful lasers will provide artificial beacons as wavefront reference sources. The combination of collecting area and resolving power of GMT enables a broad range of exciting science beyond the reach of current facilities. The GMT science goals include: 1) the nature of dark matter and dark energy 2) the first stars and galaxies 3) star and planet formation 4) the evolution of galaxies and 5) the growth of black holes. I will describe the current status of the GMT project.

All are welcome! Tea, coffee, biscuits will be served at 2:45 P.M.