

Tel Aviv University , Astronomy and Astrophysics Seminar

Dr. Wendy Freedman

Director, Carnegie Observatories

Holzblat Hall

The Giant Magellan Telescope Project

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 and third off-axis mirrors have been cast. 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 with lasers providing 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.