

## MAP OF THE UNIVERSE PROJECT

- **Goal:** A three-dimensional map of the Universe, including 1,000,000 galaxies; 300,000 quasars; 1,000,000 intergalactic gas clouds; 1,000,000 stars in our own galaxy.
- **Size of the Map:** The volume of the Universe that we will map completely will be 100 times larger than ever mapped before. A volume 1,000 times larger still will be mapped sparsely.
- **Why Do It?** In the 16<sup>th</sup> century, voyages of discovery mapped the world; in our time, we can map the Universe, bequeathing a unique intellectual treasure to humankind.
- **What Questions Will the Map Answer?** What *is* the large-scale structure of the Universe? How has this structure evolved since the Big Bang? Was the structure produced by gravity, or by an unknown subatomic particle?
- **Telescope and Site:** A telescope with a large field of view will be built, located at Apache Point, New Mexico (sharing site and facilities with the Astrophysics Research Consortium telescope, now nearing completion).
- **Major Instruments:** Four-color CCD electronic *camera* with 120,000,000 picture elements (pixels); *spectrograph* capable of recording the electromagnetic spectrum of 900 galaxies, quasars, and stars simultaneously.
- **Exploits Three New Technologies:** Area of the four-color CCD camera will be 30 times larger than the largest current camera; spectrograph will utilize 900 precision-placed optical fibers, 20 times more fibers than ever done before in astronomy; data processing rate and archive size will be 500 times larger than anything in astronomy today.
- **Why Hasn't It Been Done Before?** The technology needed is available only now; the single-purpose nature of the project is unusual in astronomy.
- **Is Anyone Else Doing It?** Others are trying to do it the old way, piece by piece; this approach would take 100 years, and the result would be an inhomogeneous map pieced together from many individual efforts.
- **Partners:** The University of Chicago, the Institute for Advanced Study, Princeton University, and, possibly, Fermilab.
- **Number of Scientists Involved:** 20 senior scientists, 10 engineers, 5 computer programmers.
- **Duration of the Project:** 10 years (3 years construction, 5-7 years operation).
- **Total Cost:** \$14 million capital, \$5 million operations.