X-ray Interferometry

WEBSTER CASH
University of Colorado

The x-ray band of the spectrum is the natural band for ultra-high resolution imaging. The sources have high surface brightness, the features are unusually compact, and the short wavelengths allow high resolution in relatively small instruments. In Phase I we reviewed the scientific potential of x-ray interferometry and showed how spatial resolution a billion times finer than HST's can be achieved in the foreseeable future. That extraordinary improvement in resolution will enable new probes of extreme environments like the warped space-time regions above the event horizons of black holes. We present an instrument design concept for the observatory, set the mission requirements and tabulate the instrument tolerances. We have studied the component technologies that are needed to assemble a full mission. We have uncovered the limitations on the eventual spatial resolution and show how the system can function down to a nano-arcsecond and below. It is our purpose to make a convincing case to both NASA and the science community that this advanced concept is of use in future missions. With the additional study proposed for Phase II it should be possible to fully demonstrate a reliable technical pathway to the launch of an exciting new class of scientific mission.