
The Large Binocular Telescope Interferometer as an ELT pathfinder

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Abstract

The Large Binocular Telescope (LBT) Interferometer (LBTI) is a strategic instrument that combines the two 8.4m apertures of the LBT for sensitive, high-angular resolution imaging and interferometric observations at thermal

infrared wavelengths. Through its observing modes making use of Adaptive Optics, Fizeau imaging interferometry,

and nulling interferometry, the LBTI makes the LBT in many respects the first ELT-like telescope. It thus serves

as a pioneer for future ELTs in terms of both science (angular resolution of a 23m telescope at thermal-infrared

wavelengths) and instrumentation (large, sensitive mid-infrared instrumentation, adaptive secondary mirrors,

co-phasing large apertures). In the northern hemisphere, the LBTI is also the only thermal-infrared interferometer

and the only interferometer using 8m-class telescopes and LBT is as of yet the only ELT-like telescope in operation

or under construction. The LBTI has successfully completed a large survey for habitable-zone dust around nearby

main sequence stars exploiting its superior angular resolution to obtain a 100x better sensitivity than space-based,

precision-photometric observations. More recently, we have emphasized Fizeau interferometry and executed our

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first extragalactic and N-band observations in this mode, together with high-contrast and precision-astrometric

observations. We are now pushing a project attempting to image the first rocky planet in the habitable zone

around one of the nearest Sun-like stars. In this article, we present an overview of the LBTI's design and capabilities, illustrated by recent science highlights, and outline future developments and observing projects.

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