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# Increased sky coverage for the 23-meter LBT

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## Abstract

Twin adaptive secondaries at the Large Binocular Telescope enable powerful observing modes. Two of these, imaging (Fizeau) interferometry and nulling interferometry, make the LBT in many respects the first ELT (see Ertel, et al, at this same meeting). Science programs that have been conducted using LBT as a 23-meter telescope include measuring habitable-zone dust around nearby stars and imaging planets during early stages of formation. To allow LBT to function as a 23-meter telescope, the light from its two 8.4-meter segments must be combined coherently. To this end, the Large Binocular Telescope Interferometer (LBTI) co-phases the two incoming beams via a piezo-electric pathlength corrector. This device is controlled by a fringe-tracking system that measures optical path difference in real time. In this talk we describe an upgrade to this system: the Fizeau Fringe Tracking Camera (FFTCam). FFTCam will improve the limiting magnitude of LBT 23-meter science from magnitude 5 at K, to magnitude 11 at K; an improvement of 6 stellar magnitudes! In addition to presenting the technical details of the project (which include upgrading the existing Rockwell PICNIC detector to a Saphira electron avalanche array), we will provide examples of the new science that will be enabled, for example, increasing the number of stars in the Taurus star-forming region that can be imaged (with 2–5 AU resolution) by nearly two orders of magnitude.

**Keywords:** LBT, LBTI, interferometry, Saphira

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