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Large Synoptic Survey Telescope (LSST): New Algorithms and Architectures

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When it enters operation, the Large Synoptic Survey Telescope will produce 15TB of image data each night, more than any other optical survey. In many respects, applying existing algorithms at this scale is a significant technical challenge on its own. However, the improved statistical errors and the fact that LSST is "deep, wide, and fast" will demand algorithms that are qualitatively different from those sufficient for surveys that are smaller in any one of these dimensions. In many cases, the computational demands for these more complex algorithms are considerably greater. In this talk, I will touch on several of these computational problems and the LSST collaboration's plans to address them, with a focus on difference imaging, image coaddition, and galaxy shape measurement for weak lensing. A particular challenge for LSST is that the state-of-the-art in both algorithm development and hardware architecture may change significantly before the survey begins, and our approach must be flexible enough to take advantage of both.

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