The Design of the LSST Camera
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The LSST camera contains a 3.2-gigapixel focal plane array comprised of 189 4K x 4K CCD sensors with 10 microns pixels. The sensors are deep-depletion, back-illuminated devices with a highly segmented architecture that enables the entire array to be read out in 2 seconds. The detectors are grouped in identical 3 x 3 arrays called “rafts.” Each raft includes dedicated front-end and back-end electronics boards, which fit within the footprint of its sensors, thus forming a 144-megapixel camera on its own. The rafts and associated electronics are mounted on a silicon carbide grid inside a cryostat. The grid also contains four sets of guide sensors and wavefront sensors at the edge of the field. The entrance window to the cryostat is the third of three refractive lenses. The other two lenses are mounted in the front of the camera body. The camera body also contains a mechanical shutter and a filter exchange system holding five large optical filters, any of which can be inserted into the camera field of view for a given exposure. A sixth optical filter will also be fabricated and can replace any of the five filters during a daytime access. Details of the LSST camera conceptual design are shown below.