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Laboratory tests for the CSST SC CCD detectors

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The Chinese Space Station Survey Telescope (CSST) is China's first 2-meter-aperture space telescope. Over a period of ten years, the Survey Camera (SC) on CSST will perform 17500 deg² wide-field and 400 deg² deep-field multi-band imaging and slit-less spectroscopic surveys, covering a wavelength range of 255-1000nm. The SC focal plane array consists of 31 charge-coupled devices (CCD) of five types, each with 9232×9216 10μm square size pixels. In this presentation, we introduce the laboratory test suites and summarize the test results of the CSST SC CCD detectors. We measure the basic detector parameters including gains, linearities, dark currents, readout noises, charge transfer efficiencies, pixel-response non-uniformities (PRNU), cross-talks and quantum efficiencies. These parameters satisfy the scientific requirements of the CSST Survey Camera. We also investigate and model several detector effects that should be considered in observation, including the bright-fatter effect, the wavelength dependency of PRNU, the charge diffusion effect and the residual image. These test results can be applied to image simulations and further investigations in data processing.

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