Experimental System for Solar Image Stabilization

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We are developing an solar image stabilization system to minimize image jitter induced by atmospheric turbulence and mechanical vibrations of the telescope. The experimental setup of the system consists of a high-speed piezo tip-tilt mirror with sub-μrad resolution, a correlation tracker with a high-speed CMOS camera, and an imaging CCD camera. For the correlation tracker, the sum of absolute difference (SAD) method is used as a correlation algorithm to perform area pattern matching. Test Images are produced by a LCD monitor mounted on a motorized linear stage. The experimental system is currently running at a low sampling frequency. In the future, it will be improved to compensate the atmospheric tip-tilt wavefront in real time.