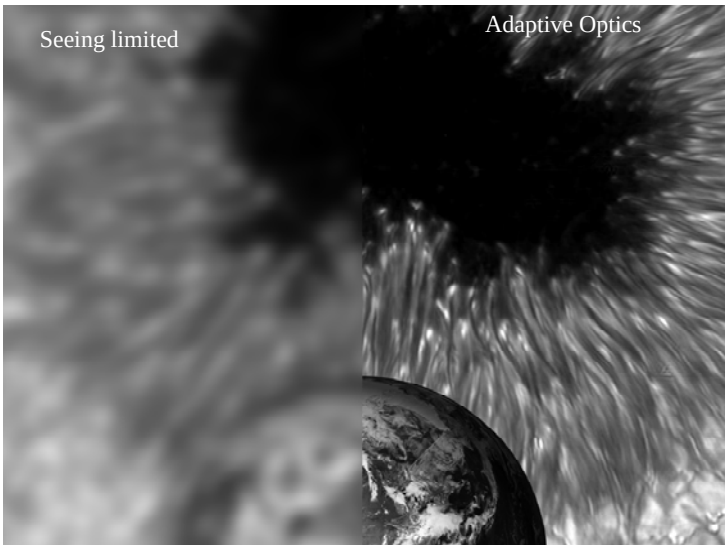

Solar Adaptive Optics – conventional and multiconjugate.

Solar adaptive optics (AO) has become an indispensable tool at ground based solar telescopes. Driven by the quest for ever higher spatial resolution observations of the Sun solar adaptive optics are now operated routinely at major ground based solar telescopes. The current high-resolution solar telescopes, such as the Dunn Solar Telescope (DST), are in the one-meter class and utilize AO for about 95 % of the observing time to achieve the diffraction limit at visible and NIR wavelengths. The next generation solar telescope, the 4m aperture Advanced Technology Solar Telescope (ATST), will have integrated wavefront correction systems, including an adaptive optics system at least an order of magnitude more complex than existing solar AO systems, enabling the ATST to deliver high Strehl observations in the visible.

Solar observations are performed over an extended field of view and the isoplanatic patch over which conventional adaptive optics (AO) provides diffraction limited resolution is a severe limitation. The development of multi-conjugate adaptive optics (MCAO) for the next generation large aperture solar telescopes is thus a top priority. The Sun is an ideal object for the development of MCAO since solar structure provides, multiple guide stars" in any desired configuration. At the Dunn Solar Telescope (DST) we implemented a dedicated MCAO bench with the goal of developing well-characterized, operational MCAO.

The current status of solar AO and MCAO development will be discussed and future developments in the field of solar AO are summarized in the context of the ATST, which is now entering its construction phase.