The science challenges for large solar telescopes

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Looking at numerical simulations of highest spatial resolution and highest resolution observations, we endeavor extrapolating what science questions can be tackled with future large solar telescopes. By means of selected examples we shall try to determine the instrumental requirements for answering these questions. For example, what polarimetric accuracy do we need to make progress regarding the topography of the internetwork magnetic field? What spatial and temporal resolution is needed to track the driving forces of dynamic fibrils, spicules and other jet-like features of the solar chromosphere, what to asses the role of vortical flows in the photosphere and its impact on the chromosphere and corona, or what to shed light on the turbulent dynamo supposedly working in the surface layers of the convection zone. Will large solar telescopes help us resolving the remaining puzzles of the sunspot penumbra and the still largely enigmatic formation process of sunspots? Besides such foreseeable science questions however, we should be aware that the best discoveries come unexpectedly and therefore, it may be worthwhile to wonder about what instrumental capabilities may be best conducive to the unexpected.