

Session 1

(Invited) EST: The future facility for accurate high-spatial resolution spectropolarimetry

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(Presented by L. Bellot Rubio)

Understanding the solar chromosphere represents one of the most difficult challenges in solar physics. The chromosphere is the thin layer in-between the plasma-dominated interior and photosphere and the magnetically-driven corona. Under a theoretical point of view, radiative transfer is dominated by the departure of LTE conditions. Deviations from classical magnetohydrodynamics may also appear as a consequence of its partially ionized nature. Chromospheric phenomena are, in turn, difficult to observe in its integrity because of the fast evolution of its fine structures and of the intrinsically weak polarization signals induced by the magnetic field. EST (European Solar Telescope) is intended to significantly improve our capabilities to observe the chromosphere and address fundamental questions such as:

- (i) How does the magnetic field emerge to the surface, evolve and interact with its surroundings?;
- (ii) how is the energy transported from the photosphere to chromosphere?;
- (iii) how is the energy released and deposited in the upper atmosphere?; and
- (iv) why does the Sun have a hot chromosphere?

To achieve these goals, EST includes the most innovative technology, with a simple, efficient and polarimetrically compensated telescope design, together with the most advanced instrumentation to simultaneously sample the physical conditions of the photosphere and chromosphere at the highest spatial and temporal resolutions and magnetic sensitivity that can give insight of the magnetic coupling of the different layers of the deep solar atmosphere. In this talk, the science, the adopted technical solutions and future perspectives of the project will be presented.