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The Fabry-Pérot Imaging Spectropolarimeters for the European Solar Telescope

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The European Solar Telescope (EST) will be equipped with a comprehensive suite of state-of-the-art instruments designed to observe the solar atmosphere at high spatial and temporal resolution and high polarimetric sensitivity. Among them are three Tunable-Imaging Spectropolarimeters/Fixed-Band Imagers (TIS/FBIs) that will provide diffraction-limited measurements of photospheric and chromospheric magnetic fields over large fields of view. Each of these instruments consists of a narrow-band imaging spectropolarimeter and a broad-band imager. The spectropolarimeter is based on a dual Fabry-Pérot etalon system and a polarimeter incorporating two nematic liquid crystal variable retarders. The imager consists of two large-format, fast cameras to allow reconstruction of the narrow-band images by means of multi-frame blind deconvolution and phase diversity. The three TIS/FBIs will be operated in parallel for high cadence monitoring of the lower solar atmosphere in three or more spectral lines simultaneously, greatly improving the capabilities of existing filtergraphs that measure individual lines sequentially. In addition, the TIS/FBI instruments will provide unprecedented polarimetric sensitivity due to their optimized design and the large photon collecting area of the 4.2 m diameter primary mirror of EST.

In this talk we will present the science goals of the EST TIS/FBI instruments. We will also review the current status of the TIS/FBIs, focusing on the main design drivers and the technological solutions adopted in this development phase. The TIS/FBIs are expected to go through a conceptual design review in 2025, together with the other instruments of the EST Instrument Suite.

Contribution Type

Theme

Solar Magnetism in High-Resolution

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