Javier Trujillo Bueno

The CLASP suborbital space experiments

The magnetic field is the main driver of the spectacular activity of the solar upper atmosphere (chromosphere, transition region and corona), but its determination is notoriously difficult. This is because the observables of the solar radiation that are sensitive to the magnetic field in such relatively hot and rarefied regions of the solar atmosphere are difficult to measure and interpret. Over the last decade novel theoretical investigations based on the quantum theory of atom-photon interactions indicated that key observables for diagnosing magnetism from the photosphere to the base of the corona are the linear and circular polarization signals that the scattering of anisotropic radiation and the Hanle and Zeeman effects introduce in ultraviolet spectral lines, such as hydrogen Lyman-alpha and Mg II h and k. This led an international team (USA, Japan and Europe) to pursue the development of the CLASP suborbital space experiments, which in 2015, 2019 and 2021 have provided unprecedented measurements of the Stokes profiles in such and other ultraviolet spectral lines, both in quiet and active regions of the solar disk. Here I present an overview of these sounding rocket experiments, which have opened a new diagnostic window in solar physics: ultraviolet spectropolarimetry.