Session 1

(Invited) The CLASP2 and CLASP2.1 missions for measuring chromospheric magnetic fields

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One of the major remaining challenges in solar physics is to decipher the magnetic structure of the solar upper atmosphere, because it is key for understanding its activity and heating. To this end, we have developed an unprecedented ultraviolet (UV) spectropolarimeter called Chromospheric LAyer Spectro-Polarimeter (CLASP2), aimed at achieving high-accuracy measurements (<0.1% at 3σ) of the linear and circular polarization across the Mg II h & k lines (280 nm). On April 11, 2019, CLASP2 was launched by a NASA sounding rocket, and successfully demonstrated that two Mn I lines and the Mg II h & k lines can be used to directly measure magnetic fields at multiple atmospheric heights, from the lower to the upper chromosphere. CLASP2 was fully recovered after its flight, and we performed the second sounding rocket experiment on October 8, 2021 (hereafter, CLASP2.1). The purpose of CLASP2.1 is to map the solar magnetic field over a 2D field of view (FOV). During the CLASP2.1 flight, we scanned 16 positions in an active region plage, and successfully measured the four Stokes profiles within a FOV of 32”x196”. Recently, the team has developed the Tenerife Inversion Code (TIC) for inferring the magnetic field information from this type of data. In this talk, we present an overview of the CLASP2 and CLASP2.1 suborbital space missions.