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Observational Detection of Drift Velocity between Ionized and Neutral Species in Solar Prominences

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It has been stated for a long time that the solar atmospheric plasma is not in a neutral state nor in a fully ionized state. The solar plasma is composed of different species, and it can be considered that each of them behaves like a fluid interacting with the rest of the species via collisions. When the collisional coupling is strong, the plasma mostly behaves as a single fluid. If this coupling weakens in certain processes, there might be deviations between the dynamical and thermal properties of the different species. To detect ion-neutral effects, it is necessary to measure as accurately as possible the velocity of different species at the same spatial position and simultaneously. Our aim is the detection of non-ideal ion-neutral effects in the solar plasma. The best candidate targets for this goal are spicules, surges, and the lower part of prominences. For this study, we observed a quiet Sun solar prominence at the east limb in June 2017 with the German Vacuum Tower Telescope. We acquired simultaneous spectra of the Ca II 8542 Å, H α 6562.8 Å, and He D3 5875.6 Å lines. The spectroscopic mode of the spectrograph was chosen to ensure the high cadence and signal to noise needed to detect these effects and shed light on the scientific questions proposed.

Student poster?

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