Session 2

(Invited) Hanle rotation finally revealed in Sr I 4607

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Measuring and interpreting small-scale magnetic fields in the solar atmosphere are crucial, yet challenging, tasks. Observations of scattering polarization and the Hanle effect in various spectral lines are increasingly used to complement traditional magnetic field determination techniques. One of the strongest scattering polarization signals in the photosphere is measured in the Sr I line at 4607.3 Å when observed close to the solar limb, that makes it a favourite line to observe since several decades. Despite many observations, one phenomenon clearly observed in several other scattering-sensitive spectral lines but turned out to be very elusive in Sr I is Hanle rotation.

In this talk I present the first observational evidence of Hanle rotation in the linearly polarized spectrum of the Sr I line at several limb distances. To achieve highly precise and unprecedentedly accurate polarization measurements needed to reveal the Hanle rotation signatures, we combined the fast modulating Zurich IMaging POLarimeter, ZIMPOL, at the IRSOL observatory in Locarno, Switzerland, with a novel technique based on a slow modulator installed in front of the telescope. With this setup, singly peaked linear polarization signals deviating from the expected scattering direction at the limb well above the noise level were detected. We carefully excluded instrumental or Zeeman origin of these signals. This suggests that the detected signals are the unambiguous signatures of Hanle rotation caused by spatially resolved, but weak magnetic fields.

Observing Hanle rotation signatures is an assisting tool to diagnosing these magnetic fields, which can be routinely applied on small spatial scales in the era of DKIST.