A first look into the magnetic field configuration of prominence threads and bubbles using spectropolarimetric data

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Abstract

We show first results of an ongoing investigation aimed at determining the configuration of the magnetic field vector in the threads of a quiescent hedgerow solar prominence using high-spatial resolution spectropolarimetric observations taken in the He I 1083.0 nm multiplet. The data consist of a two-dimensional map of a quiescent prominence and a slit time series showing the evolution of prominence threads. The time series samples the rise of a prominence bubble. The observations were obtained with the Tenerife Infrared Polarimeter (TIP) attached to the German Vacuum Tower Telescope at the Observatorio del Teide (Spain). We also use data from the Solar Dynamic Observatory and the STEREO satellites to put the TIP observations in context. The He I 1083.0 nm Stokes signals are interpreted with the HAZEL inversion code, which takes into account the key physical processes that generate and/or modify circular and linear polarization signals in the He I 1083.0nm triplet: the Zeeman effect, anisotropic radiation pumping, and the Hanle effect. We investigate the polarization signals and show maps of the strength and orientation of the magnetic field vector in the prominence threads and in areas surrounding of the prominence bubble. We also investigate the variations of the magnetic field vector during the rising of the prominence bubble.

Keywords: Prominence, magnetic field, polarization, He 10830

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