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# Observation of the magnetic field in solar tornadoes

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## Abstract

We present high sensitivity ( $10^{-4}$ ) spectropolarimetric observations, with high spatial resolution ( $\sim 0.6''$ ), and temporal evolution (up to four hours) of the recently discovered "solar tornadoes". The spectropolarimetry was performed at the He I line at 108.3 nm with the TIP instrument attached at the VTT (Observatorio del Teide). Simultaneously, at the same telescope, we recorded high cadence ( $\sim 2$ sec) movies at the core of the H $\alpha$  line and the Ca II K line, which have been treated with blind deconvolution techniques to reach the diffraction limit of the telescope. Context EUV images from the SDO satellite have also been included in our analysis. From inversion of the spectropolarimetric data and the simultaneous multiwavelength observations we recover the full magnetic field topology and strength, evolving in time. This is the first empirical reconstruction of the magnetic field in a solar tornado, which have been associated with the barbs of filaments. Finally, I will also discuss important issues on the observations and data analysis, as well as on the weaknesses of previous inversion approaches, and how to overcome them.

**Keywords:** spectropolarimetry, magnetic field, solar tornadoes, prominences

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