COLD PLASMA ROTATION IN THE TORNADO-LIKE PROMINENCE OF JULY 13, 2014: A REAL MOTION OR AN ILLUSIVE EFFECT?

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The contribution presents results of analysis of the tornado-like prominence which shows swirling-like motions in the SDO/AIA imagery at EUV wavelengths, using the Hα 2D spectral imaging acquired with the Coronal Multi-channel Polarimeter for Slovakia (CoMP-S) situated at the Lomnicky Peak Observatory in Slovakia. The aim of the study is to address the question whether this structure is a real tornado (vertical column of plasma violently rotating around central axis) or we just observe illusive signatures of an apparent rotational motion, like oscillation. Our results indicate that: a) the detected Doppler shifts do not show a permanent blue/red-shift pattern along the vertical axis of the structure during the whole 45-min observing interval, b) the present variations of the Doppler shifts (± 4 kms⁻¹) are not clearly correlated in general with the Hα integral line emission of the structure, c) the Doppler shift variations do not show any regular oscillatory pattern. We conclude that the Doppler shifts of this particular tornado-like structure cannot be interpreted as real cold plasma rotation around the vertical axis of the structure. However, the SDO/AIA observations show clear illusive vortical motions in this tornado-like structure. We suggest that the ‘vortical illusion’ (Panasenco et al., 2014) - a combination of the counter-streaming flows in the prominence threads and possible radiative transfer effects - are causing the apparent rotational motion of this tornado-like structure.