

Interactive comment on “Signatures of red-shifted footpoints in the quiescent coronal loop system” by Yamini K. Rao et al.

Anonymous Referee #2

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The manuscript deals with the multiwavelength Doppler velocity estimates from spaceborne instrumentation, for a quiet Sun region with coronal loop structures. The authors interpret the Doppler estimates as plasma flow patterns at loop footpoints and concludes the role of impulsive heating mechanism for the same. The paper looks interesting; however, some major concerns need to be clarified before being considered for the publication. I will list the major science queries, followed by some minor corrections, related with grammar and else.

Major comments: (1). The spectral resolution for IRIS data corresponds to 1 km/s, as mentioned by the authors on Page 3, line:10. However, the Doppler estimates for Ni I wavelength are below this level and are totally unreliable. How these estimates can be used to infer the plasma flows in this passband? Same applies to estimates from Mg II

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k and C II wavelengths as well.

(2). Page 3, line-13: Authors have acquired Doppler estimates by using single/double Gaussian fits to the line profiles. No such fits were shown. Please include the same, along with error estimates.

(3). Figure 3: SDO/AIA and IRIS intensity maps are shown with possible locations of loop footpoints. What is the photospheric magnetic field configuration at the footpoints and does it anyhow affect the plasma flows? Inclusion of an HMI LOS magnetogram for the same ROI would be useful.

(4). Doppler/FWHM maps for ROI should be included (maybe as a part of Fig. 3), to help the reader to get an idea of plasma flows at the loop footpoints and else.

(5). Page 7, last paragraph: The conclusion for plasma up/down flows is not clear. Authors have nowhere shown any signatures of either low-frequency heating or nano-flare heating. I am not sure how they have concluded the stated physical mechanisms for the analysed case. DEM analysis of the region can shed some light on impulsive heating in the loop structure.

Minor comments:

(1). Page 1, Line-20: The classification of the loops is based on their estimated thermal profile, or on the location/topology? Please clarify.

(2). Figure 1: Please add a colorbar to help the reader on the data range (highest, lowest emission).

(3). Page 2, Line-1: Rephrase the sentence “In this paper, we study ... for moss region.” It is very confusing now.

(4). Page 3, Line-4: “The rest wavelengths”. What are rest wavelengths? Please clarify.

(5). Page 5, Last line (and else): Here, you have used the format km s^{-1} , while in

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Figures 4-8, the format is km/s. Please be consistent and change accordingly.

(6). Page 6, Line-7: "The blueshifts (upflows) show small increment . . . chromospheric flows". Are the estimated increments below IRIS spectral resolution reliable? Please explain.

(7). Figures 4-9: The velocity distributions for "different ions". Here you are estimating Doppler shifts from wavelengths, observed from IRIS, and no ions were sampled for their Doppler shifts. Also, these ions emit at a range of temperatures, over a range of height in the solar atmosphere. Please rephrase to avoid confusion.

(8). Please check the grammar.

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