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

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(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 k and C II wavelengths as well.

Reply: Though the upflows have values less than IRIS spectra resolution showing negligible or small plasma flows, the values are reliable enough within th error range. Our work emphasizes on the red-shift observed in TR line (Si IV).

(2). Page 3, line-13: Authors have acquired Doppler estimates by using single/double

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Discussion paper

Gaussian fits to the line profiles. No such fits were shown. Please include the same, along with error estimates.

Reply: The single Gussian fitting is done for optically thin lines while for the lines having multiple peaks, doble Gaussian fit has been done.

Mg II k line has been used w.r.t absorption core (also known as Mg II k3) which has been modelled by using two Gaussians (one positive and one negative). We have used straight line to fit the continuum.

(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.

Reply: In our work, we were interested in showing the Doppler velocity trend at the footpoints of quiescent coronal loops with height. The HMI map has been shown in the revised paper where the whole plage region is dominated by postive magnetic polarities but the absence of any kind of mix polarities at the footpoints of the loop systems ruling out the possibilties of magnetic reconnection.

(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.

Reply: Intensity, Doppler velocity, FWHM map of Si IV and the related text has been included in the paper. The parametric plots are shown in Fig. 5.

(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.

Reply: It has been speculated that impulsive heating might be the cause of such flows

since there are symmetic as well as asymmetic profiles but still it does not rule out other possibilities. Also, the DEM analysis has been carried out and shown in Figure 4.

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.

Reply: The loops have been classified on the basis of temperature range which has been included in the text as follows:

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

Reply: The colorbar has been added.

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

Reply: Rephrased to “In this paper, we study quiescent coronal loop arches having one of their footpoints anchored at the edges of moss region.”

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

Reply: The rest wavelengths are the wavelengths which have been determined from the averaged profile of the quiet-Sun region ranging from -208.76” to -191.302” in x-direction and 205.248” to 221.8835” in y-direction of the raster for calibration purposes. The values of different spectral lines are mentioned in the revised paper.

(5). Page 5, Last line (and else): Here, you have used the format km sËĘ-1, while in Figures 4-8, the format is km/s. Please be consistent and change accordingly.

Reply: The notation has been made consistent to km sËĘ-1 throughout the paper.

(6). Page 6, Line-7: “The blueshifts (upflows) show small increment . . . chromospheric

flows". Are the estimated increments below IRIS spectral resolution reliable? Please explain.

Reply: The Doppler velocity values below IRIS resolution indicates the negligible or small plasma flows from upper photosphere to upper chromosphere. However, our work shows the Doppler velocity pattern where prominent red-shift has been observed in Si IV line. The small values have been used to indicate the Doppler velocity pattern at differnt heights.

(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.

Reply: The sentence has been changed to "different spectral lines" wherever "different ions" was mentioned.

(8). Please check the grammar.

Reply: It has been checked thoroughly.

Please also note the supplement to this comment:
https://www.ann-geophys-discuss.net/angeo-2019-66/angeo-2019-66-AC2-supplement.pdf

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