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ROTATIONAL MOTION IN TRANSITION REGION LOOPS

Because of limited spatial resolution the internal structure of a loop is poorly understood observationally. In particular the question of braiding and helicity is of high interest to constrain models and our view of how the magnetic field drives the dynamics and heating of loops. Imaging and spectroscopic data from IRIS at the highest spatial resolution currently available in the EUV provide new information on these questions. We present IRIS data from the transition region in active regions using the Si IV at 1394 A and 1403 A lines which trace plasma at a temperature of about 10^5K. Here we investigate cool medium-scale loops (length ~30Mm, width ~1Mm) near disk center that are associated with a filament channel. The intensity maps in Si IV and the slit-jaw-imager time-series show the presence of numerous loops with evidence of plasma flowing along them at a peojected speed of around 50-100km/s. Doppler maps reveal peculiar Doppler shift patterns in these loops: one side is consistently blueshifted while the other side is redshifted, together indicating a rotational component of the flow about the loop axis with about 20 km/s. Such rotational motions have been observed before, e.g. with spicules, and have been interpreted as torsional Alfvenic perturbations. Because the Doppler pattern for these loops seems to be stable and present all along the loop, for these loops such an interpretation is unlikely. Instead we suggest that the plasma flows across and along the loop indicate the presence of a helical magnetic field in the loop, with several winding from end to end. These helical magnetic structures would have to be stabilised by a strong enough overlying magnetic field. We will discuss these result in terms of an unresolved, coherent braiding (or twisting) of the field lines inside the loops.