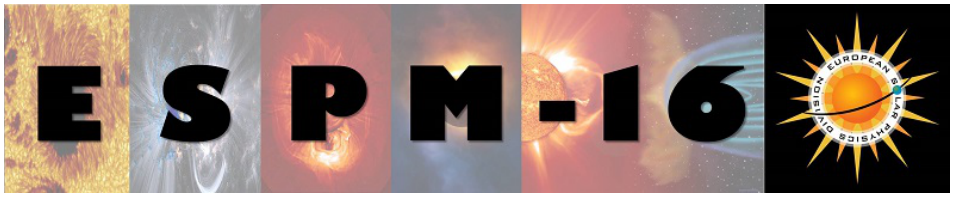

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Torsional Alfvén pulses in zero-beta flux tubes

Tuesday, 7 September 2021 09:26 (13 minutes)

We investigate the generation of mass flux due to a torsional Alfvén pulse, as observed in e.g. photospheric magnetic bright points (MBPs). A flux tube model is developed, with the waves introduced at the lower, photospheric boundary of the tube as a magnetic shear perturbation. Due to the nature of MBPs we simplify the model by using the zero-beta approximation for the plasma inside the tube. We derive that the presence of torsional Alfvén waves can result in field-aligned plasma flux formed non-linearly due to the Lorentz force generated by the perturbations. Thus the model is consistent with jet formation observed in the lower solar atmosphere. The formation of the rising mass flux may even be a viable contribution to the generation of chromospheric mass transport, playing potential roles in the form of localised lower solar atmospheric jets. The analytical results are demonstrated by an example of the type of Alfvén wave perturbation that one might expect to observe, and comparison is made with properties of spicules known from observations.

Student poster?

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