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Flux tube dependent propagation of Alfvén waves in the solar corona

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Alfvén wave turbulence has emerged as an important heating mechanism to accelerate the solar wind. The generation of this turbulent heating is dependent on the presence and subsequent interaction of counter-propagating alfvén waves. This requires us to understand the propagation and evolution of alfvén waves in the solar wind in order to develop an understanding of the relationship between turbulent heating and solar wind parameters. In this paper we aim to study the response of the solar wind upon injecting monochromatic single frequency alfvén waves at the base of the corona for various magnetic flux tube geometries. We use an ideal magnetohydrodynamic (MHD) model using an adiabatic equation of state. An alfvén pump wave is injected into the quiet solar wind by perturbing the transverse magnetic field and velocity components. The alfvén waves were found to be reflected due to the development of the parametric decay instability (PDI). Further investigation revealed that the PDI was suppressed both by efficient reflections at low frequencies as well as magnetic flux tube geometries.