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Alfvén wave driven polar plumes: dependence on the chromospheric conditions

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We present a model for the generation of polar plumes generated by Alfvénic torsional motions of the footpoints of a bipolar magnetic structure in a coronal hole. We use a 2.5D axisymmetric MHD numerical model of an isothermal corona and solar wind with transparent boundary conditions. An additional term accounts for wave reflection occurring at the dense chromospheric layers (expressed in terms of a reflectivity parameter).
Alfvén waves are continuously injected at the coronal base and a dense jet (plume) forms along the magnetic axis of the structure.
The plume's growth rate depends strongly on the frequency of the surface motions and the reflectivity parameter.
The jet presents a series of blobs propagating outwards along its axis as slow mode wave-fronts. The temporal modulation of the blobs depend both on the injection frequency and phase difference between both sides of the magnetic structure.