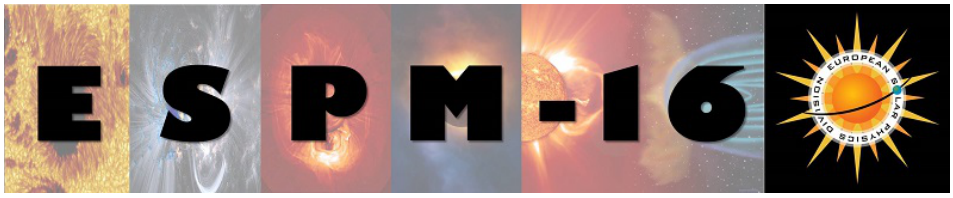


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# The formation and heating of chromospheric fibrils in a radiation-MHD simulation

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How mass is loaded into the upper chromosphere and transition region is an important unclosed matter. The standard fibrilar mass loading scenario is of feeding material up relatively static fieldlines by the guiding magnetic field, resulting from initial impulses made by p-mode oscillations (Hansteen et al 2006, De Pontieu et al 2007). Instrumentation such as DKIST and EST will provide an excellent opportunity to address this issue.

We use passive tracer particles seeded into dense fibrils in 3D RMHD Bifrost simulations to investigate fibril creation and destruction. The most common "lift and drain"mass loading scenario found is markedly different to previous suggestions. Box oscillations, the simulation equivalent of the p-modes initiate the formation. Rather than loading material up the footpoints of static fieldlines, the fieldlines themselves rise, firstly near the footpoints where the plasma velocity is well aligned with vertical fieldlines. Material is then caught above the flattened apexes of rising fieldlines and lifted by the Lorentz force along the central lengths of the fibrils as the fieldline untwists and becomes more parabolic. Subsequently, material drains into one or both footpoints under gravity. Instances are also found of material with horizontal velocities that are simultaneously elevated in rising fieldlines, creating the illusion of parabolic motion up a static fieldline.

These mechanisms are not implausible additional solar scenarios for fibrilar mass loading. Criteria for discerning between this and standard mass loading scenarios are described. Experimental parameters required to achieve more standard fibrilar mass loading in the simulations are discussed.

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