M27a

Excitation of Slow-Modes in Network Magnetic Elements Through Magnetic Pumping

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From radiation magnetohydrodynamic (RMHD) simulations of the solar atmosphere we find a new mechanism for the excitation of longitudinal slow modes within magnetic flux concentrations. We find that the convective downdrafts in the immediate surroundings of magnetic elements are responsible for the excitation of slow modes inside the magnetic element.

The coupling between the external downdraft and the plasma motion internal to the flux concentration is mediated by the inertial forces of the downdraft that act on the magnetic flux concentration. These forces pump the internal atmosphere in the downward direction, which entails a fast downdraft in the photospheric and chromospheric layers of the magnetic element. Subsequent to the transient pumping phase, the atmosphere rebounds, causing a slow mode traveling along the magnetic flux concentration in the upward direction and developing into a shock wave in chromospheric heights, possibly capable of producing a dynamic fibril.

In this talk, we will report on the details of the excitation mechanism of slow modes in our RMHD simulations and discuss an observational detection of this process.