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## Multi-periodic propagating slow magnetoacoustic waves in a coronal plasma fan.

Magnetohydrodynamic (MHD) waves have been utilised for decades for probing plasmas and increasing understanding of dynamic processes within the solar atmosphere, a technique called MHD seismology. Propagating slow magnetoacoustic (MA) waves are particularly valuable for MHD seismology due to their persistence, propagation along magnetic field lines, and their links to the coronal heating function. Although thought to be generated in underlying layers of the solar atmosphere, the specific mechanism for this process remains debated.

We present an observation of slow MA waves with three distinct periodicities along sunspot-anchored coronal fan feathery structures, with corresponding chromospheric oscillations, using data from the Atmospheric Imaging Assembly. The waves propagate outwards along three feathery structures in active region 13100 on September 19th 2022 at 05:00-08:00 ~UT.

Time distance analysis is used to determine wave periods, decay lengths, and projected phase speeds along feathery structures. Fourier analysis on individual pixel intensity curves is used to create period and narrowband-intensity maps. Distinct periods of  $2.47 \pm 0.02$ ,  $2.81 \pm 0.02$ , and  $3.06 \pm 0.04$  mins are detected in three separate feathery structures. We observe a decrease in the decay length and projected wave speed from the cooler 171 Å to the hotter 193 Å, and 211 Å channels. An increase in the period intensity is seen in the 304 Å channel, where each feather is anchored, corresponding to the slow wave period detected in the 171 Å data.

These findings indicate that propagating slow waves exhibit fine structuring in coronal fans, corresponding to their anchoring locations, providing insights into the drivers of these waves.

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