

UNDERSTANDING WAVES AND FLOWS IN CORONAL ACTIVE REGIONS

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Recent high resolution and cadence observations by SDO/AIA, and spectroscopic data from the Hinode satellite provide ample evidence for EUV waves and flows in active regions. The launch of IRIS satellite provide additional information on the source of the waves and flows in the transition region and below. Some of the waves are associated with flaring activity and CME eruptions propagating rapidly across the magnetic field, or in magnetic funnels. Other wave modes are evident as transverse loop oscillations and as longitudinal propagating intensity fluctuations. Flows are evident in direct high resolution EUV observations and as Doppler shifts and broadening in Hinode and IRIS spectroscopic observations. The waves provide the basis of coronal seismology as well as potentially can supply the energy that heats the corona and accelerates the solar wind. Detailed MHD modeling is required in order to understand the complex wave and flow activity and disentangle their observational signatures, while improving coronal seismology. I will present recent observations and the results of recent 3D MHD modeling studies of waves and flows in active regions using realistic magnetic active region structures, and the impact of the modeling on our understanding of these diverse but related phenomena in the solar corona.