

[SO15] Observations of mutual helicity of EUV coronal loops

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Observations of the solar corona show sheared and twisted magnetic field in association with eruptive activities such as flares, filament eruptions, and coronal mass ejections. Stressed magnetic field is quantified by magnetic helicity. Total helicity is defined by the summation of multiplication of linking number and square of flux. So far, the association of total helicity and eruptive event was shown, however the clear role of magnetic helicity of solar activity was not understood. In order to understand the role of magnetic helicity in the solar corona better, it is useful to decompose the helicity into self helicity and mutual helicity and to determine their properties. As an initial step, in this work, we have examined a set of loops in an active region that are mutually linked. By tracing the relative position of the loop footpoints we have found that the mutual linking number is about 0.5.

[SO16] Vector Magnetic Fields of AR 10930 observed by
Hinode(Solar-B) Stokes Polarimetry

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We present Hinode Stokes Polarimeter (SP) magnetogram of AR 10930 that produced several strong flares including two X-class flares. Its great advantage is that polarization signals are free from seeing effect and have excellent photometric accuracies. The active region is composed of a big sunspot and a nearby small sunspot with highly sheared penumbral fibrils between two sunspots. The calibration from Stokes profiles to magnetic field vectors was made by a polarity inversion code based on the Milne Eddington model. We have applied the Uniform Shear Method (USM) for resolving the 180 degree ambiguity to the magnetogram. The ambiguity seems to be well resolved for nearly all areas. The ambiguity-resolved magnetic fields show that the transverse fields are nearly parallel to the polarity inversion line, implying a strong vertical current density kernel. A comparison between its intensity image and the vector magnetogram shows that the transverse field directions well follow the pattern of penumbral fibrils, especially near the highly sheared polarity inversion line. Finally, we discuss several scientific topics to be studied by Hinode SP.