[SO09] Revised Chae's Method for the Helicity Transfer Rate

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Initially Chae (2001) developed the method on how to calculate the magnetic helicity transfer rate through a given boundary based on the helicity transfer equation (Berger 1984). In the present paper we revised the method to be consistent with the helicity flux obtained from the helicity flux density which was independently suggested by Pariat et al.(2005). In this revised Chae's method, we used direct integration rather than Fourier transform method to get Ap used in the helicity transfer equation. We found that the helicity transfer rates obtained by the revised Chae's method and the sum of helicity flux density over the boundary are consistent very well.

[SO10] Discovery of 100 Minute Non-radial Oscillations from the Transverse Motion of Magnetic Fragments

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Magnetic helicity rate that is determined by horizontal motions of magnetic elements usually fluctuates with time with large amplitudes. The present study is motivated by the possibility that such fluctuation may represent oscillatory patterns in the motion of magnetic elements, which may carry some important physical signal other than noise. To investigate this possibility, we have traced the locations of individual magnetic fragments that are seen in an uninterrupted long time sequence of high resolution and 1 minute cadence data taken by SOHO/MDI. Our application of the period analysis to the time-location data of each magnetic element has revealed that oscillatory components do exist that have frequencies ranging from 0 mHz to 0.4 mHz, with the most probable value of 0.1 mHz, corresponding to a period of 100 minutes. This kind of oscillations is hard to be explained by the well-known processes in the photosphere such as granulation, supergranulation and p-mode oscillation. We propose that the 100 minute oscillations we have found may be a new kind of oscillations, which may be attributed to convective motions and oscillations inside the solar interior, including internal g-mode oscillations.