B28b Observation of the interaction between counter-helical fluxes on the sun

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Recently, in both theories and observations, there has been a popular research on the role of counter-helical fluxes for triggering large solar events. Theoretically, the magnetic reconnection between counter-helical fluxes is the most effective to release magnetic energy and eject strong particle streams that affect the space weather. We have found several evidence for the co-existence and interaction between counter-helical fluxes, e.g., an X5.3 flare in AR9077 (Liu and Zhang, A&A, 2002), an X3 flare and a flux rope eruption in AR10030 (Liu et al., ApJL, 2003; Liu and Kurokawa, PASJ, 2004), and an X10 flare in AR10486 (Liu et al, 2004, preparation), based on vector magnetograms and H-alpha observations obtained by the instruments on ground and UV observations from TRACE. From the previous work, we think that the quick changes of sunspot magnetic fields and filament channels are the direct results from the reconnection between counter fluxes. The unstable atmospheric seeing on the groud, however, prevents us from obtaining clear evidence for the interaction between counter fluxes. We need more precise measurements of the temporal variations in the three-dimensional magnetic field with Solar-B.

We propose, therefore, the observations of the evolutional changes of the photospheric vector magnetic field along the neutral line in active regions to find evidences of the interaction between opposite-sign-helicity fluxes which may trigger filament eruptions and flares.