## M21a The Evidence for Kink Instability to a $\delta$-spot Collapse

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It is well known that large eruptive flares only occur in complex topologies; particularly, $\delta$-spot regions in which sunspots umbrae of opposite polarity exist within the same penumbra.

In the previous study reported at the Autumn Meeting of ASJ of the last year, we presented such a region, NOAA 9026, showing that the $\delta$-spot emerged and kept stable at the beginning several days, but was suddenly disrupted within several hours, during which a short sequence of four large white-light flares initiated in this region and associated with energetic CMEs. The preliminary results obtained from TRACE and MDI movies, Hida $H_\alpha$ data and Huairou vector magnetograms have suggested that this active region form by the emergence of a twisted flux tube of the 'knot'-structure; the $\delta$-spot corresponds to the 'knot'-structure which is finally untied to cause the collapse.

In this study based on the further analyses on proper motions and magnetic flux evolution, we propose a new scenario by kink instability to explain the formation of the $\delta$-spot and its collapse. Some distinct photospheric features such as 'switchback' of magnetic neutral line, rotation motions of the sunspots, and rapid sheared surface flows provide the convincing evidence for this driven mechanism, which is consistent with 3-D simulations by Linton et al. (1999). Furthermore, we are searching for more evidence from the chromospheric and coronal observations such as La Palma $H_\alpha$, TRACE 1600/171 and Yohkoh SXT.