

## Three dimensional structure of magnetic field in solar corona associated with solar flare

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Solar Optical Telescope(SOT) on the HINODE satellite launched in 2006 provides us the high resolution magnetic field vector data on the photosphere. The purpose of this study is to investigate the solar flare by extrapolating the coronal magnetic field from the photospheric magnetic measurements. In this study, the active region:AR1 0930 in 2006/12/12(before flare) and 2006/12/13(after flare) is investigated. We extrapolated a three-dimensional coronal magnetic field before and after this flare. Force-free field is assumed in the solar corona. In force-free fields, current density  $j$  is parallel to magnetic field  $B$  ( $j = \alpha B$ ). We use MHD relaxation method[1,2] to extrapolates the coronal field. Potential field[PF]( $\alpha$  is equal to zero), which is extrapolated from the line-of-sight photospheric magnetic field, is relaxed to nonlinear force-free fields[NLFFF]( $\alpha$  is not a constant) using induction equation. We compare these results with X-ray data observed at the same time.

### References

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2. G.Valori,B.Kliem,R.Keppens,Extrapolation of a nonlinear force-free field containing a highly twisted magnetic loop,Astronomy and Astrophysics 433,335-347(2005)