

## Fine structure of three dimensional coronal magnetic field in polar region of the Sun

# Daikou Shiota[1]; Hiroaki Ito[2]; Saku Tsuneta[3]; Kanya Kusano[4]; Takeru Suzuki[5]; Noriaki Nishikawa[6]  
[1] RIKEN; [2] STE Lab., Nagoya Univ.; [3] NAOJ; [4] STEL, Nagoya Univ; [5] Physics dept., Nagoya Univ.; [6] ESC,  
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Acceleration process of solar wind, which is closely related to the heating process of coronal plasma, is one of the most important problem in the solar physics. Coronal magnetic field and Alfvén wave propagating in the field can play important roles in the acceleration and the heating. Polar coronal holes can be the source regions of solar wind. Recently, Tsuneta et al. (2008) reported scattered patchy structures of vertical magnetic field with intensity as strong as 1 kG in the south polar region observed with the Stokes Polarimeter (SP) of the Solar Optical Telescope (SOT) aboard Hinode satellite. This discovery may change our current understanding of magnetic structures in the polar region of the Sun, and suggests us to revisit the relation between the magnetic structure and the acceleration of solar wind.

In order to discuss the propagation of Alfvén wave in the solar atmosphere in the polar region of the Sun, we calculate three dimensional magnetic field using the magnetic field observation and a high resolution potential field model. The modeled field reproduces fun out (canopy) structure rooted to the patchy concentrations of magnetic flux in the polar region. Combined with an atmosphere model (Vernazza et al. 1981), the model suggests that the strong concentration of the magnetic field may make retardation of Alfvén wave phase between neighboring field lines rooted on the edge of the canopy. The situation is ideal for Alfvén wave to dissipate due to phase mixing process proposed by Heyvaerts and Priest (1983).