## [구SE-09] Tiny Pores observed by HINODE/SOT

Kyung-Suk Cho[1], Su-Chan Bong[1], Jongchul Chae[2], Yeon-Han Kim[1], and Young-Deuk Park[1]

[1]*Korea Astronomy and Space Science Institute,*
[2]*Astronomy Program, Seoul National University*

The study of pores, small penumbraless sunspots, can give us a chance to understand how strong magnetic fields interact with convective motions in the photosphere. For a better understanding of this interaction, we investigate the temporal variation of several tiny pores smaller than 2“. These pores were observed by the Solar Optical Telescope (SOT) onboard Hinode on 2006 December 29. We have analyzed the high resolution spectropolarimetric (SP) data and the G-band filtergrams taken during the observation. Magnetic flux density and Doppler velocities of the pores are estimated by applying the center of gravity (COG) method to the SP data. The horizontal motions in and around the pores are tracked by adopting the Nonlinear Affine Velocity Estimator (NAVE) method to the G-band filter images. As results, we found the followings. (1) Darkness of pores is positively correlated with magnetic flux density. (2) Downflows always exist inside and around the pores. (3) The speed of downflows inside the pores is negatively correlated with their darkness. (4) The pores are surrounded by strong downflows. (5) Brightness changes of the pores are correlated with the divergence of mass flow (correlation coefficient > 0.9). (6) The pores in the growing phase are associated with the converging flow pattern and the pores in the decay phase with the diverging flow pattern. Our results support the idea that a pore grows as magnetic flux density increases due to the convergence of ambient mass flow and it decays with the decrease of the flux density due to the diverging mass flow.

## [구SE-10] A MAGNETOHYDRODYNAMIC MODEL FOCUSED ON THE CONFIGURATION OF MAGNETIC FIELD RESPONSIBLE FOR A SOLAR PENUMBRAL MICROJET

Tetsuya Magara
*School of Space Research, Kyung Hee University*

In order to understand the configuration of magnetic field producing a solar penumbral microjet that was recently discovered by Hinode, we performed a magnetohydrodynamic simulation reproducing a dynamic process of how that configuration is formed in a modeled solar penumbral region. A horizontal magnetic flux tube representing a penumbral filament is placed in a stratified atmosphere containing the background magnetic field that is directed in a relatively vertical direction.

Between the flux tube and the background field there forms the intermediate region in which the magnetic field has a transitional configuration, and the simulation shows that in the intermediate region magnetic reconnection occurs to produce a clear jet- like structure as suggested by observations. The result that a continuous distribution of magnetic field in three-dimensional space gives birth to the intermediate region producing a jet presents a new view about the mechanism of a penumbral microjet, compared to a simplistic view that two field lines, one of which represents a penumbral filament and the other the background field, interact together to produce a jet. We also discuss the role of the intermediate region in protecting the structure of a penumbral filament subject to microjets.