Magnetic evolution and temperature variation in a coronal hole

J. Zhang, G. Zhou

National Astronomical Observatories, Chinese Academy of Sciences, Beijing 100012, China, zjun@ourstar.bao.ac.cn

Coronal holes are cool, low density regions observed both at low latitudes and at the two polar regions of the Sun, their predominantly unipolar magnetic fields are open to the interplanetary region, giving rise to high-speed solar wind that can lead to geomagnetic storms. Employing Big Bear Solar Observatory (BBSO) deep magnetograms and SOHO/EIT images in a coronal hole region, observed from October 10 to 14, 2005, we have explored the magnetic flux evolution and temperature variation. The following results are obtained: (1) On October 10, the early phase of the coronal hole formation, more than 70 % of the magnetic flux is negative, and coronal temperature, estimated from EIT 195 and 171 Å images, is 1.05x10ˆ6 K in the hole. (2) On October 14, the end phase of the hole, about 60% of the magnetic flux is negative, and the temperature increases to 1.10x10ˆ6 K. Our results display that in a coronal hole, there is a connection between magnetic evolution and coronal temperature, the less imbalance of the both polarities of the magnetic flux, the higher coronal temperature.