

Orientation of X-ray bright points in the quiet Sun

Kohei Ueda

National Astronomical Observatory of Japan / University of Tokyo

Ryouhei Kano

National Astronomical Observatory of Japan

Saku Tsuneta

National Astronomical Observatory of Japan

Hiroto Shibahashi

University of Tokyo

Abstract. X-ray bright points (XBPs) are small coronal structures distributed at all latitudes. Although XBPs have been observed as a point-like feature until recently, they are resolved to have complex loop-like structures thanks to the high-resolution images obtained by the X-Ray Telescope aboard the *Hinode* satellite. Since XBPs are associated with bipolar magnetic field in the photosphere, we measured the orientation of such loop structures for 488 XBPs picked up in 26 snapshot X-ray images near the disk center. The images were taken in the solar minimum period between December 2006 and November 2008. The distribution of the orientation is slightly but clearly biased to the east-west direction: the random distribution is rejected with significance level of 1% by χ^2 -test. The distribution is similar to the orientation distribution for the bipolar magnetic fields. The XBP orientation is, however, much more random than that of the bipolar magnetic fields with similar size. Comparing the orientation distribution of XBPs with that of emerging bipolar regions with similar size (Harvey, 1993), we estimate that 24% of the XBPs are due to emerging bipoles, while remaining 76% are due to chance encounter of opposite polarities. There are two different kinds of XBPs: XBPs formed via chance encounters of opposite polarities and XBPs resulting from emergence or growth of pre-connected polarities. The distribution of the XBP orientation observed here suggests influence of global toroidal fields to the emergence of small scale magnetic fields.