The HIA instrument on board the Tan Ce 1 Double Star near-equatorial spacecraft and its first results

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Abstract: On 29 December 2003, the Chinese spacecraft Tan Ce 1 (TC-1), the first component of the Double Star mission, was successfully launched within a low-latitude eccentric orbit. In the framework of the scientific cooperation between the Academy of Sciences of China and ESA, several European instruments, identical to those developed for the Cluster spacecraft, were installed on board this spacecraft. The HIA (Hot Ion Analyzer) instrument on board the TC-1 spacecraft is an ion spectrometer nearly identical to the HIA sensor of the CIS instrument on board the 4 Cluster spacecraft. This instrument has been specially adapted for TC-1. It measures the 3-D distribution functions of the ions between 5 eV/q and 32 keV/q without mass discrimination. TC-1 is like a fifth Cluster spacecraft to study the interaction of the solar wind with the magnetosphere and to study geomagnetic storms and magnetospheric substorms in the near equatorial plane. HIA was commissioned in February 2004. Due to the 2 RE higher apogee than expected, some in-flight improvements were needed in order to use HIA in the solar wind in the initial phase of the mission. Since this period HIA has obtained very good measurements in the solar wind, the magnetosheath, the dayside and nightside plasma sheet, the ring current and the radiation belts. We present here the first results in the different regions of the magnetosphere and in the solar wind. Some of them are very new and include, for example, ion dispersion structures in the bow shock and ion beams close to the magnetopause. The huge interest in the orbit of TC-1 is strongly demonstrated.
Author Keywords: Magnetosphere Physics (Magnetopause, cusp, and boundary layers, Magnetosheath, Solar wind-magnetosphere interactions)

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