

Chapter 7 Solar and Heliospheric Physics and Interdisciplinary Research  
with LHAASO

บทที่ 7 ฟิสิกส์เกี่ยวกับดวงอาทิตย์และฮีลิโอสเฟียร์และงานวิจัยสหสาขาด้วย LHAASO

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The Large High Altitude Air Shower Observatory (LHAASO) is a huge cosmic ray detector suite located above 4400 m altitude in Sichuan Province, China. The collaboration has over 270 members in various countries. This article was part of a set of articles about the prospects to perform new science with LHAASO. In particular, this article concerns measurements of Galactic cosmic rays and what information these can provide about solar and heliospheric physics and interdisciplinary research.

For example, the Sun affects cosmic rays in various ways. At relatively lower energies, cosmic rays are deflected by magnetic fields and scattered by magnetic fluctuations. Our Sun emits a flow of ionized gas (i.e., plasma) called the solar wind that pervades the interplanetary medium. The region of space reached by the solar wind is called the heliosphere, which is many times larger than the orbits of the planets. The solar wind drags magnetic field lines from the Sun throughout the heliosphere. So at these energies, Galactic cosmic rays must penetrate the entire heliosphere, and effects of scattering may be observed in LHAASO data. At higher energies, the Sun physically blocks the cosmic rays, and its intense magnetic field deflects them to a measurable extent. It should even be possible to measure interplanetary magnetic fields in this way. Other interdisciplinary research discussed in this article includes geophysical studies, such as measuring effects of earthquakes and thunderstorms.

