

Acceleration of He⁺ at the Earth's Bow Shock; observed on 3 May 1998 based on the GEOTAIL particle and field measurements.

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We have studied the event around the Earth's bow shock observed on 3 May 1998 based on the GEOTAIL particle and field measurements. In this event, an unusually enhancement of He⁺ in the solar wind was observed.

This event was first reported by *Skoug et al.* [1999] using the ACE spacecraft. According to *Skoug et al.*, He⁺ was observed over a prolonged interval on May 2-4, 1998. The He⁺/He⁺⁺ ratio during this event exceeded 0.5% for a period of more than 24 hours. The solar wind He⁺/He⁺⁺ ratio is typically 10⁻⁶ [*Kozlovsky, 1968*], corresponding to a coronal freezing-in temperature of 10⁻⁶. So the presence of He⁺ suggests that this material originated at a much lower temperature in the solar atmosphere. (In fact, a disappearing filament and prominence were observed at the Sun in association with this event. So, this high He⁺/He⁺⁺ ratio indicates the presence of prominence material.)

Because of its mass/charge, in the shock acceleration, He⁺ will behave differently from other solar wind materials such as proton and alpha particle. We thought difference between these three particles will tell us about shock acceleration mechanism. Additionally, in this event, GEOTAIL crossed the Earth's bow shock many times, we can study how the shock parameters work on the shock acceleration, too. So, using GEOTAIL, we have analyzed He⁺ acceleration at the Earth's bow shock.