

# Dependence of suprathermal electrons observed at bow shock on the solar wind parameters

# Yoshitaka Seki[1]; Iku Shinohara[2]

[1] ISAS/JAXA; [2] JAXA/ISAS

Previous observations reveal that suprathermal electrons up to 20 keV are observed at the quasi-perpendicular Earth's bow shock. The spectral indices of the non-thermal electron component vary between -3 and -4. However, the electron acceleration process at the bow shock is still uncertain. We study the statistical properties of such suprathermal electrons at quasi-perpendicular bow shock by using the GEOTAIL data. In order to understand the dependence of the electron acceleration on the solar wind parameters, we carry out some event studies under extreme solar wind conditions. To determine indices of suprathermal distributions, observed distribution functions are fitted by a double power law. The obtained index parameters are sorted depending on three solar wind parameters (Alfvén Mach number, plasma beta, and the ratio of the plasma frequency to the electron gyro-frequency) as well as the shock angle. We show how emergence of suprathermal electrons is controlled by shock parameters, and the physical mechanism of electron acceleration at the shock transition layer is discussed. We performed statistical analysis of acceleration electrons events observed at quasi-perpendicular bow shock. The criterion for choosing statistical analysis data is that the product in normal vector derived from Minimum Variance Analysis (MVA) and Global shock model (Peredo et al., 1995) is within 10 and shock angle derived from MVA is greater than 60. The selected number of events is 41. We will show how emergence of suprathermal electrons is controlled by shock parameters, and the physical mechanism of electron acceleration at the shock transition layer will be discussed.