S001-28
A 会場 ：11/5　PM1 （13:45-15:30）
14:00〜14:15

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Energy Partition between Thermal and Nonthermal Plasmas during Magnetic Reconnection

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The nonthermal particle acceleration during magnetic reconnection remains a fundamental topic in several astrophysical phenomena, such as solar flares, pulsar wind, and magnetars, for more than half a century, and one of the unresolved questions is its efficiency. Recently, nonthermal particle acceleration mechanisms during reconnection have been extensively studied by particle-in-cell simulations, yet it is an intriguing enigma as to how the magnetic field energy is divided into thermally heated plasmas and nonthermal particles. Here, we study both non-relativistic and relativistic magnetic reconnections using large-scale particle-in-cell simulation for a pair plasma and indicate that the production of the nonthermal particle becomes efficient with increasing the plasma temperature. In non-relativistic plasma case, most of the magnetic energy can be converted into the thermal plasma heating, while in the relativistic hot plasma case, the nonthermal particle acceleration becomes dominant rather than the thermal plasma heating. Furthermore, we determine that the heated plasmas by reconnection can be approximated by a kappa distribution function with the kappa index of approximately 3 or less (equivalent to 2 or less for the power-law index), and the nonthermal energy density of reconnection is approximately over 95% of the total internal energy in the downstream exhaust.