

# **Dr. Samuel Totorica will be joint appointed in the collaboration with the Department of Astrophysical Sciences, Princeton University on December 1st, 2021.**

更新日：2021年11月 1日更新

Joint Appointment for the Associate Research Scholar of the Department of Astrophysical Sciences, Princeton University

Dr. Samuel Totorica

Collaborator (PI) 1: Prof. Mami Machida (National Institutes of Natural Sciences)

Collaborator (PI) 2: Prof. Amitava Bhattacharjee (Department of Astrophysical Sciences, Princeton University)

Research locations : National Institutes of Natural Sciences and Department of Astrophysical Sciences, Princeton University



Astrophysical jets with well-collimated supersonic plasma flows can be observed in various layers of the universe, such as protostars, X-ray binaries (compact objects), and active galactic nuclei (AGN). One of the most important aspects of jet activity is the energy release of the black hole gravitational energy, which reaches over  $10^8$  times the Schwarzschild radius. The jet is considered to be the origin of accelerated cosmic ray particles in the energy range of  $10^{15}$  to  $10^{17}$  eV for X-ray binaries and  $10^{18}$  eV or more for AGNs. Supersonic jets form various shocks in the jet beam, and these shocks become the sites of particle acceleration. Since the jet is a magnetized plasma, magnetic reconnection is expected to occur. We will use fully kinetic particle-in-cell (PIC) simulations to study particle acceleration and radiation associated with these systems and develop reduced models to improve magnetohydrodynamic simulations of global jet evolution. [More Details \[PDFファイル / 59KB\]](#)