AAPPS-DPP 2018 Plenary speaker Name: Prof. Masahiro Hoshino
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Rationale: Dr. Hoshino made pioneering work on particle acceleration in magnetic reconnection and shockwaves in astrophysical plasmas. Recently he and his colleagues proposed several intriguing particle acceleration mechanisms for both non-relativistic and relativistic plasma regimes by using large-scale particle-in-cell simulations.

Talk Title: Particle acceleration in plasma universe

Short abstract: Explosive phenomena such as supernova shocks, pulsar wind nebulae, gamma-ray bursts, solar flares, and Earth's substorms are known to be associated with high-energy particles, and the production of non-thermal particles, whose energies exceed extremely the thermal temperature, are ubiquitous phenomena in space and astrophysical plasmas. Yet the high energy particle acceleration mechanism remains to be resolved in collisionless plasmas. Dr. Hoshino can give a good plenary talk by synthesizing both recent observations of explosive astrophysical phenomena and theoretical progress on the fluid and particle-in-cell simulations that can help our understandings of kinetic processes of particle acceleration in plasma universe. Future computational simulations and laboratory experimental opportunities will be briefly mentioned as well.

List of related published papers

1. M. Hoshino, Stochastic particle acceleration in multiple magnetic islands during reconnection, Phys. Rev. Lett., 108(13) DOI:10.1103/PhysRevLett.108.135003 (2012)
2. K. Higashimori, N. Yokoi, and M. Hoshino, Explosive Turbulent Magnetic Reconnection, Physical Review Letters, DOI:10.1103/PhysRevLett.110.255001 (2013)
3. Y. Matsumoto, T. Amano and M. Hoshino, Electron acceleration in a nonrelativistic very high Alfven Mach number shock, Physical Review Letters, DOI:10.1103/PhysRevLett.111.215003 (2013)
4. M. Hoshino, Angular momentum transport and particle acceleration during magnetorotational instability in a kinetic accretion disk, Physical Review Letters, DOI:10.1103/PhysRevLett.114.061101 (2015)
5. Y. Matsumoto, T. Amano, T. Kato, and M. Hoshino, Stochastic electron acceleration during spontaneous turbulent reconnection in a strong shock wave, Science, 347, 6225, 974-978 DOI: 10.1126/science.1260168 (2015)
6. M. Iwamoto, T. Amano, M. Hoshino and Y. Matsumoto, Persistence of precursor waves in two-dimensional relativistic shocks, Astrophys. J., https://doi.org/10.3847/1538-4357/aa6d6f (2017)
7. K. Hirabayashi and M. Hoshino, Stratified simulations of collisionless accretion disks, Astrophys. J., https://doi.org/10.3847/1538-4357/aa74b3 (2017)
8. Y. Matsumoto, T. Amano, T. N. Kato, and M. Hoshino, Electron surfing and drift accelerations in a Weibel-dominated high Mach-number shock, Physical Review Letters, DOI:10.1103/PhysRevLett.119.105101, (2017)