AAPPS-DPP 2018 Plenary speaker Name: Prof. Kazuo Makishima
Affiliation: the University of Tokyo

Rationale: Professor Makishima is one of the leading scientists in X-ray astronomy. He has studied cosmic hot plasmas by combining X-ray observations and plasma physics. He was awarded Chushiro Hayashi Prize of astronomical society of Japan in 2006 for his study of black hole candidates and clusters of galaxies by X-ray observations. More recently, he was awarded Japan Academy Prize in 2015 for his study of strong magnetic fields of neutron stars by means of X-Ray observations. I would like to nominate him for a plenary talk on the physics of hot plasmas in clusters of galaxies, which comprise the most dominant form of cosmic baryons. His plenary talk will enable plasma scientists to share the recent knowledge on the distribution, dynamics, and chemical compositions of the largest-scale cosmic hot plasmas revealed by X-ray observations.

Talk Title: Physics of the largest-scale hot plasmas in the Universe

Short abstract: The large-scale plasmas, associated with clusters of galaxies and detectable through X-ray observations, provide the most dominant known form of cosmic baryons. Being hot ($T\sim10^8$ K), tenuous ($\sim10^{-3}$ cm^{-3}), and weakly magnetized (with beta ~100), they are also regarded as the most ideal classical hot plasma. In addition, their hydrostatic confinement by gravity means that they are almost free from various instabilities. Nevertheless, in each cluster, a large number of galaxies are moving through the plasma with transonic velocities. Interactions between the plasmas and the galaxies are expected to drive a series of interesting phenomena, including continuous and stable plasma heating, morphological changes of the galaxies, and production of high-energy comic-ray particles.

List of related published papers

1. Makishima, K. et al., X-ray Probing of the Central Regions of Clusters of Galaxies, Publ. Astron. Soc. Japan 53, 401 (2001)
2. Takahashi, I., Kawaharada, M.,Makishima, K., Matsushita, K., Fukazawa, Y., Ikebe, Y., Kitaguchi, T., Kokubun, M., Nakazawa, K., Okuyama, S., Ota, N., Tamura, T., X-ray Diagnostics of Thermal Conditions of the Hot Plasmas in the Centaurus Cluster, Astrophys. J. 701, 377 (2009)
3. Gu, L., Xu, H., Gu, J., Kawaharada, M., Nakazawa, K., Qin, Z., Wang, J., Wang, Y., Zhang, Z., Makishima, K., Two-phase ICM in the Central Region of the Rich Cluster of Galaxies A1795: A Joint Chandra, XMM-Newton, and Suzaku view, Astrophys. J. 749, 186 (2012)
4. Gu, L., Gandhi, P., Inada, N., Kawaharada, M., Kodama, T., Konami, S., Nakazawa, K., Shimasaku, K., Xu, H., Makishima, K., Probing of the Interactions between the Hot Plasmas and Galaxies in Clusters from z=0.1 to 0.9, Astrophys. J. 767, 157 (2013)
5. Hitomi Collaboration, The quiescent intracluster medium in the core of the Perseus cluster, Nature 535, 117 (2016)