

"Micro-Collective Phenomena" of Ultra-high Temperature Plasmas, and Fusion Science



The greatest challenge in realizing fusion energy is to make the fusion system more compact and efficient. As the core plasma decreases in size, the temperature gradient increases, resulting in complex fluctuations that can cause a degradation in confinement and lead to abrupt instabilities. To better understand the causes and effects of these unique plasma fluctuations—an issue relevant not only to fusion reactors but also to space and celestial bodies—we will develop an experimental system capable of precisely controlling and manipulating the microscopic state of ultra-high-temperature plasma. This system will allow us to measure plasma with the highest resolution in the world. By integrating plasma diagnostics with theoretical simulations, we aim to establish guiding principles that will promote innovation in fusion energy.

