EAST Experimental Campaign 2012

(2/1/2012-5/30/2012)

Campaign Goals

With the advent of significantly augmented auxiliary heating and operational capabilities, the Experimental Advanced Superconducting Tokamak (EAST) is starting an experimental campaign in February, 2012, aiming at exploring the boundary and understanding the physics of the EAST operational space with favorable stability and confinement, and developing suitable means to expand this space toward steady-state operation. To these ends, the campaign is focusing on ICRH and LHCD physics, MHD and ELM control, L-H transition and pedestal physics, divertor physics and emerging PSI issues under long pulse operational conditions, and developing integrated scenarios that integrate high performance with advanced divertor steady-state operation to achieve:

- 30s H-mode with I_p = 400~600 kA, $n_e = 2.5\sim4\times10^{19}$ m^{-3}, and P_{in} = 1~4 MW.
- A few hundreds seconds scale long pulse discharges at lower current and density, *i.e.*, I_p = 300~400 kA and $n_e = 2.0\times10^{19}$ m^{-3} .

EAST Capabilities

EAST has undertaken an extensive upgrade during the last shutdown, from Plasma Facing Components (PFC), poloidal field (PF) power supply, auxiliary heating systems to diagnostics, as highlighted below:

- Replaced all the carbon tiles on the wall and divertor surfaces with molybdenum tiles, except those on the divertor target plates, allowing baking up to 250 C.
- Upgraded the Li evaporation system to improve coating uniformity. This, along with enhanced wall baking capability, will greatly facilitate recycling control.
- Implemented a new pellet injection system and a new supersonic molecule beam injection (SMBI) system for ELM control and deeper fuelling.
- Augmented auxiliary heat capabilities with upgraded RF antennas to allow 4 MW LHCD @ 2.45 GHz and 6MW ICRF @ 25-75MHz.

Added new and upgraded many diagnostics for key profiles and more specific measurements, *e.g.* edge turbulence and fluctuation.More information

To obtain a better understanding of ICRH and LH heating and current drive physics, and their synergistic effects. To develop a high performance scenario relevant for steady-state operation.

2. ***MHD and ELM control***

To develop an integrated ELM control scenario for controlling ELMs by means of LHCD power modulation, pellet pacing, impurity seeding and SMBI, explore accessibility to small or no ELM regimes.

To access stability boundaries with sufficient heating/current drive power and control emerged instabilities by modulating ICRF, LHCD and profile tailoring, develop sawtooth control with fast particles induced by ICRH..

3. ***L-H transition and pedestal physics***

To assess the role of edge turbulence and zonal flows on the L-H transition and the effect of recycling, divertor configuration and X-point height.

To investigate ELM dynamics, and plasma rotation in ICRH/LHCD plasmas.

4. ***Divertor physics and emerging long-pulse PSI issues***