A three-barrel prototype was developed for delivery of pellets to the plasma. Photo: US ITER/ORNL

**US Contribution**

The US is responsible for disruption mitigation technology development and deployment (up to a capped value).

**Overview**

The system has two functions: 1) limiting the impacts of plasma current disruptions to the tokamak vacuum vessel, first wall blankets and other in-vessel components, and 2) suppressing the formation and deleterious effects of high energy runaway electrons. The mitigation and suppression are expected to be accomplished by rapid shattered pellet injection (SPI).

Shattered pellet injection involves cryogenically freezing pellets of the desired species (deuterium or neon) in a specially designed “pipe gun.” The pellet is injected into the plasma with a high pressure gas (deuterium) when a disruption is detected. The pellet is “shattered” upon entry to better assimilate the material into the plasma.

**1st Plasma Scope**

Develop and deploy shattered pellet injection technology. Improve SPI capability and reliability.

**Status**

A shattered pellet injection prototype has been delivered to the JET tokamak in the UK for installation and testing in support of ITER disruption mitigation methods and technology. Two similar prototypes are being fabricated for the KSTAR tokamak in Korea.
Technical Description

- **Material delivery for thermal mitigation event:**
  8-10 kPa*m$^3$ gas equivalent (nominally 2 kPa*m$^3$ per injector location)

- **Material delivery for runaway electron mitigation event:**
  up to 90 kPa*m$^3$ gas equivalent of material

- **Pellet types:**
  Deuterium (D), Neon (Ne) or Argon (Ar)