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6.2 Design of shattered pellet injection system and diagnostics capability on J-TEXT

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Disruptions have the potential to cause severe material wall damage to large tokamaks like ITER. The mitigation of disruption damage is essential for the safe operation of large scale tokamak. The shattered pellet injection(SPI) technique, which is regarded as the primary injection method in ITER, has been show several advantages relative to massive gas injection, including more rapid particle delivery, higher total particle assimilation and more centrally peaked particle deposition. A dedicated argon SPI system focus on disruption mitigation and runaway current dissipation experiment has been being designed for the J-TEXT tokamak. It will be put into disruption experiment in next year. The pellet will be cooled by a refrigerator to about 80K. The pellet can be shaped with 5 mm diameter and 4-10 mm length. Helium gas at room temperature will be used as a propellant gas for pellet acceleration. The pellet can be injected with speed of 150-300m/s. The time interval between injection cycles is about 8 minutes. The pellet will be shattered at edge of the plasma with the speed of 150-200m/s and then injected into the core of plasma. Related diagnostics for the disruption mitigation experiment by the SPI is presented.

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