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A description of the ITER's gas injection systems and current R&D activities☆

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ABSTRACT

The gas injection system (GIS) is an indispensable part of ITER fueling system. It deliveries the necessary gas species from tritium plant to vacuum vessel, pellet injection system or neutral beam for plasma operation and fusion power shutdown. In this paper, the current design status of GIS, including the previous design changes, is briefly described. As the GIS design justification and support, the experimental study on GIS response time is illustrated. The factors delayed the GIS response time are identified, and two kinds of control mode are proved to be effective for improving the GIS response time. The exploration on magnetic shield design shows the discrepancy of shielding performance occurs in the case of the paralleling external magnetic field to the sample cylinder. These R&D works prove the design feasibility in some ways, and support possible solutions for design challenges as alternative design options.