

# International Conference on Fast Reactors and Related Fuel Cycles: Next Generation Nuclear Systems for Sustainable Development (FR17)



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## Passive Shutdown Systems for Liquid Metal-Cooled Fast Reactors

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A major focus of the design of modern fast reactor systems is on inherent and passive safety. Inherent safety means that the reactor design is such that the plant remains in a safe condition solely on the basis of the laws of nature; these laws ensure that all performance characteristics remain within safe bounds under all conceivable circumstances. The definition of passive safety is broader, and implies that no human intervention, no triggering signals and no supply of external energy are required for the reactor to remain in a safe condition. Inherent and passive safety features are especially important when active systems such as the SCRAM-systems for reactor shutdown are not functioning properly. Passive shutdown systems can operate either continuously (analogous to reactivity feedback mechanism or function as a backup actuation method for the conventional reactor SCRAM system).

Numerous passive shutdown systems designs have been developed over the years in fast reactor research programs across the world. To summarize the state-of-the-art in this field, the members of the technical working group on fast reactors at the IAEA (TWG-FR) has been collecting the various approaches, design principles, engineering solutions and their impact on reactor safety and operation, in a joint collaborative project over the last year. A review of a total of 20 different systems, divided in to five categories depending on the way they are actuated, will eventually be presented in a Nuclear Energy Series report written jointly by the TWG-FR group. These systems and the general findings of the TWG-FR group will be presented in a dedicated poster session at the FR17 meeting.

### Country/Int. Organization

Technical Working Group on Fast Reactors, IAEA

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