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## The challenge of designing safe experiments for future nuclear reactors

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### Abstract

Experimental study of the nuclear fission chain reaction behavior during severe core accidents is a key issue in the safety design of future Gen-IV fast reactors but practically, it is impossible to recreate the required physical conditions in the lab. Severe core accidents in nuclear reactors usually progress in several stages, which include voiding of the coolant fluid, fuel meltdown, and molten pool formation. These changes, which involve geometry deformation and redistribution of materials in the reactor, might lead to prompt divergence of the nuclear fission chain reaction inside the reactor's core resulting in abrupt power excursions. An innovative approach to experiments' design is presented, which enables utilization of zero-power research reactors to study the fission chain reaction behavior in high-temperature (exceeding 2,500°C) degraded nuclear cores. This new class of experiments can be used to bridge existing substantial and crucial knowledge gaps and greatly support the improvement of safety features of future reactors.

**Date & Location:**

**Tuesday, May 29, 2018, 11:00**

**Lecture room, Physics Building (ground floor)**



**YDSEEP WEEKLY SEMINAR**

