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Einladung zum Seminar über „Nukleare Energieerzeugung“

Zeit: **Montag, 10. November 2025, 11:00 Uhr**

Ort: Karlsruher Institut für Technologie, Hermann-von-Helmholtz-Platz 1
76344 Eggenstein-Leopoldshafen, INR, Bau 521, Raum 302

Referent: **Herr Prof. Koji Morita,** Kyushu University, Japan

Titel: Application of Particle-Based Simulation to the Analysis of Multi-Component, Multi-Phase Flows in Fast Reactor Severe Accidents

Abstract:

Fast reactors (FRs) are not designed in their most reactive configurations; however, during core disruptive accidents (CDAs), phenomena such as coolant boiling, fuel melting, and subsequent core material relocation can lead to positive reactivity insertion. Consequently, the evaluation of severe accidents, particularly CDAs, has been a major issue in the safety design and licensing of FRs since their early development. The SIMMER code, developed at the Japan Atomic Energy Agency (JAEA), has played a central role in this field by mechanistically modeling complex thermal–hydraulic and neutronic interactions in a damaged core. Nevertheless, its multi-fluid approach for simulating multi-component, multi-phase flows is inherently limited in resolving local mesoscale thermal–hydraulic phenomena that strongly influence recriticality and material relocation behavior during severe accidents.
To address this limitation, Kyushu University has been developing particle-based simulation methods as next-generation analysis tools to complement conventional computational approaches for severe accident analysis. The particle-based approach directly represents multi-component and multi-phase flow behavior without relying on empirical models or engineering correlations. In this presentation, several applications of particle-based simulation to representative CDA-related phenomena in sodium-cooled FRs are introduced. These examples demonstrate the potential of particle-based simulation to provide deeper physical insight into complex flow behavior and to bridge the gap between mesoscale understanding and system-level safety analysis.

Hinweis: Alle auswärtigen Besucher des Seminars werden gebeten, ihren gültigen Personalausweis oder Reisepass mitzubringen