Karlsruher Institut für Technologie

Institut für Neutronenphysik und Reaktortechnik
Leiter: Prof. Dr.-Ing. Robert Stieglitz

Hermann-von-Helmholtz-Platz 1
76344 Eggenstein-Leopoldshafen

Aushang

Bearbeiter/in: Frau I. Schwartz

Datum: Donnerstag, 16. Mai 2019

Einladung zum Seminar über „Nukleare Energieerzeugung“

Zeit: Montag, **17. Juni 2019,** 11:00 Uhr

Ort: Karlsruher Institut für Technologie, Hermann-von-Helmholtz-Platz 1
76344 Eggenstein-Leopoldshafen, INR, **Bau 521**, Kolloquiumsraum **(R. 302)**

Referent: Herr Alejandro Soba, Comisión Nacional de Energia Atómica, Buenos Aires, Argentina

Title: DIONISIO 3.0: a full 3D code developed to described the behavior of a nuclear fuel rod under irradiation

Abstract:

The DIONISIO 3.0 code simulates the behavior of a typical nuclear power reactor (LWR or PHWR) fuel rod under irradiation. Starting from the power history and environmental temperature profiles, the code predicts temperature distribution in the rod, elastic and plastic stress and strain fields, creep, densification and swelling, release of fission gases, cesium and iodine to the internal free volume of the rod, gas mixing, pressure increase, irradiation growth of the Zircaloy cladding, superficial oxide layer growth, hydrogen uptake and release, restructuring and grain growth in the pellet. The effects of an internal or external corrosive atmosphere as well as the possibility of pellet-cladding mechanical interaction are also considered. The code presently simulates a fuel rod in its whole length. To this end, the bar is axially divided into a user-defined number of sectors, in each of which the linear power and external temperature are assumed uniform. The complete problem in the system formed by one pellet and the corresponding segments of cladding and gap is solved in each sector subjected to the local conditions. This local domain could be solved with a full 3D volume or using axisymmetric bi-dimensional approximation.
During the recent years the DIONISIO code has undergone several improvements aimed at widening its predicting capability. To give account of the high burnup range, models of radial distribution of power density, burnup, and concentration of U and Pu nuclides within the pellet were incorporated. From other point of view, several models to get account the description of LOCA accidents (Loss of Coolant Accident) were incorporated.
In this lecture a brief description of the capabilities of the code will be presented, pointing to the international projects in where DIONISIO has been participated and will participate in the future, describing the new models in where the Code and Models section at this moment are working.

gez. R. Stieglitz

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