

Webinar Invite

Join us on March 23, 2022 8:30 am EDT (UTC-4)

Scale Effects Analysis on the Thermal Hydraulic Behavior of Impinging Jets in Sodium Fast Reactors

In the industry and especially in the nuclear field, simulation software plays an important part on the study of new prototypes, as building scale 1 prototype is both complex and expensive. To assess new design options and validate associated simulation software, most experiments are performed on small-scale mock-ups. However, distortions of a studied phenomenon can occur from a small-scale model to a prototype: this is known as scale effects. Without understanding of these effects, results from models cannot be transposed to the prototype scale and numerical results cannot be validate either.

In the French SFR project, an important problematic is the raise of the core jets in the upper plenum for specific operating conditions. When these jets raise, the flow pattern in the vessel is modified and leads to thermal fluctuations reducing the lifetime of the reactor's components because of thermal fatigue. While this raise can be observed on small-scale mock-up, it is important to be able to characterize both this phenomenon and its transposition. For this purpose, Benjamin Jourdy works on a methodology based on bibliography synthesis and experimental results, leading to the conception of a new mock-up dedicated to this study.



Mr. Benjamin Jourdy graduated in 2019 from the Ecole Centrale de Marseille in the field of Materials & Structure Mechanics. During his studies, he worked part-time for the French Atomic Energy and Alternative Energy Commission (CEA) at Cadarache as an apprentice on the dynamic response of fuel assemblies in PWR under seismic excitation. He designed the instrumental setup of EUDORE, a mock-up with three fuel assemblies at scale 1:2, and performed experimental campaigns in representative conditions of PWR. Now, he is completing his PhD in the field of thermal-hydraulics, on the subject "Scale effects analysis on the thermal hydraulic behaviour of impinging jets in Sodium Fast Reactors". His PhD focuses on buoyancy effects of the core jets in SFR after impingement of the Upper Core Structure, and their transposition from small-scale mock-ups to the reactor size. He also won 2nd place of the 2021 Pitch your Gen IV research competition, available at: <https://www.youtube.com/watch?v=XwM4eC-K2lq>.

Free webcast!



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