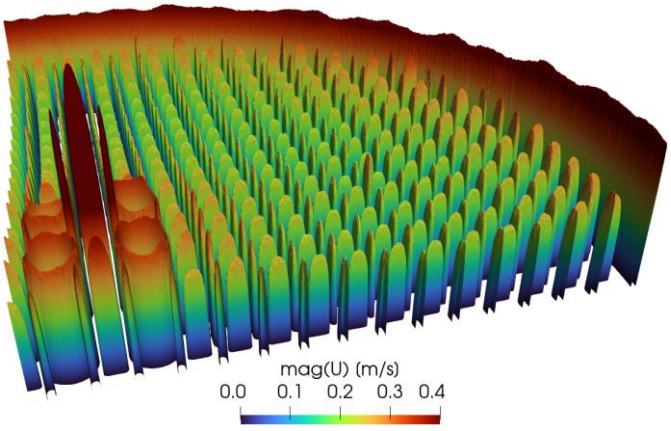
foamForNuclear: a crash course on *GeN-Foam*

Alessandro Scolaro[1], Giovanni Nervi[1], Thomas Guilbaud[1,2]

[1]École Polytechnique Fédérale de Lausanne, Route Cantonale, 1015, Lausanne, Switzerland
[2]Transmutex SA, Chem. de Blandonnet 8, 1214 Vernier, Switzerland

This workshop introduces the *foamForNuclear* ecosystem and its main multiphysics solver, *GeN-Foam*, offering a practical entry point to nuclear engineering applications with OpenFOAM. After a short primer on the history of OpenFOAM in nuclear reactor analysis and a quick tour of the libraries' capabilities, we move straight into a fully hands-on session using the new Python API. Participants will learn the full workflow—from case setup to mesh creation, solver configuration, and post-processing—and how to use the Python API to script, parameterize, and automate studies. The workshop starts from simple, single-physics cases and progressively builds toward more realistic, coupled scenarios. It targets a broad audience, from graduate students to industry professionals; no prior experience with OpenFOAM or *foamForNuclear* is required. By the end, attendees will be able to (i) create a *GeN-Foam* case from scratch, (ii) modify boundary conditions and physics options, (iii) couple different regions/physics and (iv) run and monitor simulations—all within a single Python-API environment.

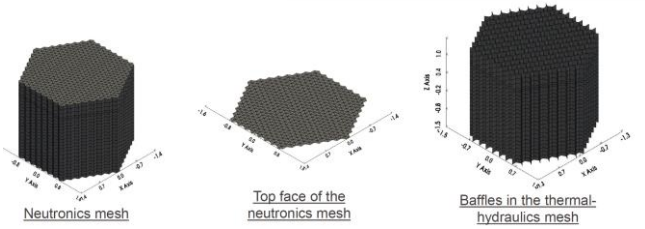
A personal laptop is required to follow the exercises live. We strongly recommend Ubuntu or Windows with WSL (Ubuntu). An installation guide with clear instructions and download links will be sent in advance to maximize hands-on time; those unable to install or without a personal laptop can still attend to get a practical showcase of *foamForNuclear*.



Velocity magnitude at the MSRE core outlet

```
ffn.run_preprocessing(model=model)

model.plot_mesh(region=nMesh, show_edges=True)
model.plot_mesh(region=thMesh, show_edges=True)
model.plot_boundary(region=nMesh, boundaryName='top')
model.plot_boundary(region=thMesh, boundaryName='baffle0')
```



Geometry creation and plotting with the Python API