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FESTIM: overview of hydrogen transport simulation capabilities

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FESTIM is an open-source simulation tool designed to model hydrogen transport in materials, with applications in fusion energy, hydrogen embrittlement, and related fields. This presentation will cover FESTIM's verification and validation framework, neutron-induced trap modeling, and its capabilities for simulating permeation barriers and experiments. Key features include component-scale modeling, advanced surface processes, and multiphysics simulations integrated with the Hydrogen Transport Materials (HTM) database. The HISP project, a collaboration with the ITER Organization, will be highlighted, focusing on coupling plasma codes with FESTIM for comprehensive reactor inventory estimations. The recent upgrade to FESTIM 2.0 introduces multispecies transport, multi-occupancy trapping, improved HPC performance, and enhanced multiphysics support, expanding FESTIM's capabilities for complex hydrogen transport challenges.

FESTIM repository: https://github.com/festim-dev/FESTIM
V&V online book: https://festim-vv-report.readthedocs.io/en/latest/

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