Special Issue

Advancements in Thermal-Hydraulic Design and Qualification of In-Vessel Components for Fusion Power Plants

Message from the Guest Editor

In-vessel components, focusing on the Breeding Blanket, are pivotal for tritium self-sufficiency and for converting neutron energy into heat, transporting it through cooling circuits, and coupling it to power-conversion systems. This Special Issue invites contributions on the status and progress of design and technology development, with emphasis on heat extraction, cooling performance, power-cycle integration, and plant availability.

We welcome contributions that quantify the entire energy pathway—from neutronic energy deposition in components to its conversion into heat transported by a coolant through the heat transport system and to its transfer into a power conversion system. Submissions should demonstrate margins against high-heat-flux and transient loads. Topics include thermal hydraulics and magnetohydrodynamics in coolants; corrosion and chemistry control; tritium production and extraction; and integration of systems into the heat transport system. Methodological papers are encouraged, also seek qualification roadmaps and facility strategies to raise TRL through separate-effects and integrated mock-up tests at representative heat fluxes, flow rates, and temperatures.

Guest Editor

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Energies is an international, open access journal in energy engineering and research. The journal publishes original papers, review articles, technical notes, and letters. Authors are encouraged to submit manuscripts which bridge the gaps between research, development and implementation. The journal provides a forum for information on research, innovation, and demonstration in the areas of energy conversion and conservation, the optimal use of energy resources, optimization of energy processes, mitigation of environmental pollutants, and sustainable energy systems.

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