

SPB9. The Simulation Of Heat Transport Phenomena In Fusion Welding

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Introduction

The application of cellular automata (CA) as a simulation tool for modeling the thermal evolution of fusion welding processes is presented. This work investigates the feasibility in coupling a finite difference scheme with a lattice gas cellular automata to address the evolution of conduction and convection heat transport, respectively.

Technical Approach & Results

A finite difference algorithm was implemented within the context of a CA to provide the numerical solution for the simulation of transient heat conduction in heterogeneous materials. A lattice gas cellular automata was then developed and coupled with the finite difference scheme to compute the heat transport due to conduction and convection. Results of this approach are compared with traditional numerical methods that have been presented in the open literature.

Conclusions

Simulation accuracy, computational speed, and implementation complexity are discussed. Future research directions are proposed.