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Transport in Passive, High Thermal Conductivity Heat Spreaders

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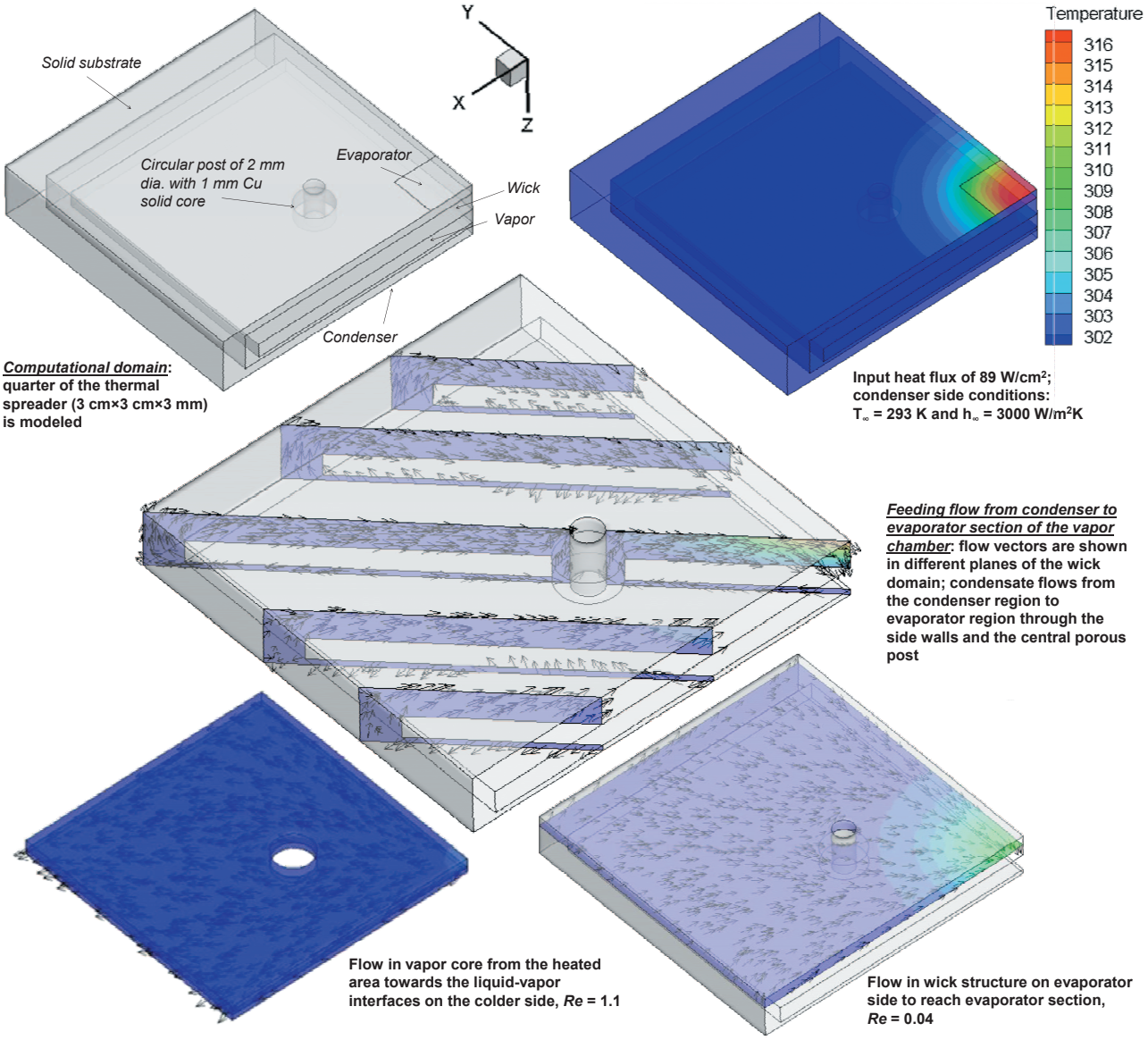

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A transient, three-dimensional model for thermal transport in heat pipes and vapor chambers is developed. The Navier-Stokes and energy equations are solved numerically. A porous medium formulation is used for the wick region. Phase change at the liquid-vapor interface is modeled using kinetic theory. The performance of a 3 mm thin vapor chamber with four circular porous posts inside the vapor core is predicted. Liquid flows from the condenser to the evaporator through two separate paths, *viz.*, the side walls and the porous posts, which lead to a shorter path for liquid return, and decrease the liquid pressure drop. Optimal placement of the porous posts would help increase the capillary limit of the heat pipe.