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Ablation patterns driven by simple flows[1] RYAN CROCKER, DANIEL HAGAN, University of Vermont, MICHAEL ALLARD, University of New Hampshire, YVES DUBIEF, University of Vermont, CHRISTOPHER WHITE, University of New Hampshire — The erosion (here through thermal ablation) of a surface driven by a turbulent, or at least nonlinear, flow may offer an interesting variety of erosion patterns. The present work is interested in the interactions between the flow coherent structures and the topology and erosion rates of such structures. The investigation involves different flows including natural convection flow and flows parallel and perpendicular to the ablated surface. The simulation algorithm is based on momentum and thermal immersed boundary techniques in a finite volume direct numerical simulation flow solver. The interface is tracked by a level set method and the ablation velocity is governed by the Stefan condition. The analysis focuses on the non-equilibrium nature of the flow and the possible prediction of erosion rates.

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