Particle Deposition for Flow over a Wedge JENNIFER ZIEREN-BERG, University of Michigan, DAVID HALPERN, University of Alabama, MARCEL FILOCHE, BERNARD SAPOVAL, Ecole Polytechnique, JAMES GROTBERG, University of Michigan — Particle transport and deposition associated with flow over a wedge is investigated as a model for particle transport and flow at an airway bifurcation. Using matched asymptotics, a uniformly valid solution is obtained to represent the high Reynolds number flow over a wedge which considers both the viscous boundary layer near the wedge and the outer inviscid region, and is then used to solve the particle transport equations. The phenomenon of boundary layer shielding is investigated and is characterized by a positive normal velocity component near the wall that pushes particles in the boundary layer away from the wall and prevents particle impaction. Additionally, deposition efficiency and relative distribution of impacted particles are presented. The present model compares well to more complex ones that consider the three dimensional structure of an airway, but is advantageous in that the boundary layer phenomena can be closely investigated.

David Halpern
University of Alabama

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