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Boundary layers in dilute particle suspensions M.R. FOSTER, Ohio State U., P.W. DUCK, U. Manchester, R.E. HEWITT, U. Manchester — Boundary layers in dilute particle suspensions have been found to have a number of interesting features. The development of a singularity at the wall has recently been found to be common to many of these flows, [1] and we note here that Falkner-Skan-type boundary layers (layers with 'edge' velocity proportional to x^m) and the boundary layer under a linearly decelerating flow [2] also break down at the wall in the absence of gravity, but can be singularity-free for heavy particles. In addition, we find that matching of the Falkner-Skan profile to an outer flow is problematic for some values of m, though the case most studied heretofore—the Blasius case (for $m = 0$)—does not feature this difficulty. Finally, a boundary layer that does not develop a singularity takes on a the typical Falkner-Skan self-similarity far downstream, in the absence of gravity. For heavy particles, however, gravity causes a constant drift of particles toward the wall, and a constant-thickness far-downstream layer. The far-downstream behavior in a light-particle suspension is different, with a particle-free zone between the wall and a particle 'shock' that grows like $x^{(1-m)}$.

[1]See Foster, Duck & Hewitt, *J. Fluid Mech.* **474** (2003) and Duck, Hewitt & Foster, *J. Fluid Mech.* **514**, (2004)
[2]Howarth (1934)

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