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Traction Reveals Nature of Wall-effects for Microswimmers near Boundaries XINHUI SHEN, MARCOS MARCOS[1], Nanyang Technological University, HENRY C. FU, University of Utah — The flow field due to a low-Reynolds number swimmer swimming in the vicinity of a planar boundary has been frequently studied using image systems of flow singularities. However, it can also be represented by an integral of the traction on the boundary. We show that examining the traction pattern on the boundary caused by a swimmer provides insights into determining when far-field multipole models are accurate. We investigate the instantaneous swimming velocity and traction induced by a three-sphere swimmer placed near a solid planar wall quantitatively. When the swimmer is far from the wall, the effect of the wall can be accurately represented using the image of a force dipole, but near the wall, a system of singularities reflecting the internal structure of the swimmer is necessary. We find that the instantaneous traction reflects these limits, and furthermore can be used to determine the range of validity of the far-field approximation. We also investigate the time-averaged velocity and traction. In the far field, the image of a quadrupole accurately represents the effect of the boundary, and the traction is also quadrupolar, while in the near field, the traction shows the influence of the internal structure of the swimmer.

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