

Abstract Submitted  
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**Microswimmers in Complex Environments with Heterogeneous Microstructure** YUNKYONG HYON, HENRY FU, University of Nevada, Reno — We will discuss the swimming of microorganisms in complex and heterogeneous environments. Microswimmers in biological complex fluids, for instance, bacteria and sperm, are often greatly influenced by heterogeneous medium microstructure with length scales comparable to themselves. We characterize the interaction between the microswimmer and the medium microstructure using the model Golestanian three-sphere swimmer, treating the hydrodynamic interaction with the microstructure through the Oseen tensor. In this investigation, the microstructure of the heterogeneous environment is modeled by fixed spheres representing obstacles, or chains consisting of spheres connected with elastic springs. We find that the swimming speed of the swimmer depends on the force and deformation exerted on micro-structure. Furthermore, we find that while short freely suspended chains and short chains anchored at their ends interact with swimmer quite differently, long enough chains interact similarly, that is, a long mobile chain acts like a anchored chain. We discuss the implications for swimmer interactions with polymer solutions and compliant networks.

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