

Abstract Submitted  
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**Collisions of deformable cells lead to collective migration**<sup>1</sup> IGOR ARANSON, Argonne National Laboratory, JAKOB LÖBER, Technical University of Berlin, Germany, FALKO ZIEBERT, Albert-Ludwig-University, Freiburg, Germany — Collective migration of eukaryotic cells plays a fundamental role in tissue growth, wound healing and immune response. The motion, arising spontaneously or in response to chemical and mechanical stimuli, is also important for understanding life-threatening pathologies, such as cancer and metastasis formation. We present a phase-field model to describe the movement of many self-organized, interacting cells. The model takes into account the main mechanisms of cell motility - actomyosin dynamics, as well as substrate-mediated and cell-cell adhesion. It predicts that collective cell migration emerges spontaneously as a result of inelastic collisions between neighboring cells: collisions lead to a mutual alignment of the cell velocities and to the formation of coherently-moving multi-cellular clusters. Small cell-to-cell adhesion, in turn, reduces the propensity for large-scale collective migration, while higher adhesion leads to the formation of moving bands. Our study provides valuable insight into biological processes associated with collective cell motility.

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