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Collective Dynamics of Dividing Chemotactic Cells ANATOLIJ GELIMSON, RAMIN GOLESTANIAN, Rudolf Peierls Centre for Theoretical Physics, University of Oxford — The large scale behaviour of a population of cells that grow and interact through the concentration field of the chemicals they secrete is studied using dynamical renormalization group methods. The combination of the effective long-range chemotactic interaction and lack of number conservation leads to a rich variety of phase behaviour in the system, which includes a sharp transition from a phase that is controlled by a weakly coupled perturbatively accessible fixed point to a phase controlled by a nonaccessible strong coupling fixed point. For a range of parameters, the perturbatively accessible fixed point has nontrivial critical exponents.

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