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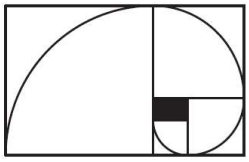

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Constant-speed interface flow from unbalanced Glauber-Kawasaki dynamics

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Abstract. We derive the hydrodynamic limit of Glauber-Kawasaki dynamics. The Kawasaki part is simple and describes independent movement of the particles with hard core exclusive interactions. It is speeded up in a diffusive space-time scaling. The Glauber part describes the birth and death of particles. It is set to favor two levels of particle density with a preference for one of the two. It is also speeded up in time, but at a lesser rate than the Kawasaki part. Under this scaling, the limiting particle density instantly takes either of the two favored density values. The interface which separates these two values evolves with constant speed (Huygens' principle).

Similar hydrodynamic limits have been derived in four recent papers. The crucial difference with these papers is that we consider Glauber dynamics which has a preferences for one of the two favored density values. As a result, we observe limiting dynamics on a shorter time scale, and the evolution is different from the mean curvature flow obtained in the four previous papers. While several steps in our proof can be adopted from these papers, the proof for the propagation of the interface is new.

Keywords. Hydrodynamic limit, Huygens' principle, Glauber-Kawasaki dynamics, sharp interface limit.

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