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**Dynamics, Rectification, and Fractionation for Colloids on Flashing Substrates** ANDRAS LIBAL, University of Notre Dame, CHARLES REICHHARDT, Los Alamos National Laboratory, BOLDIZSAR JANKO, University of Notre Dame, CYNTHIA OLSON REICHHARDT, Los Alamos National Laboratory — We show that a rich variety of dynamic phases can be realized for mono- and bidisperse mixtures of interacting colloids under the influence of a symmetric flashing periodic substrate. These type of substrates have been attracting growing interest due to recent experimental breakthroughs that allow the creation of dynamic periodic arrays using optical and holographic techniques. With the addition of dc or ac drives, these system show phase locking, jamming, and new types of ratchet effects. We studied these effects in detail. The ratchet effect can be used for charge separation of a bidisperse system. In this system, in some regimes we find that the addition of a non-rathceting species increases the velocity of the ratcheting particles. We show that these effects occur due to the collective interactions of colloids.

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