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Some consequences of violating Newton's third law

SCOTT HILL, Southern Methodist University — The field of “social physics” uses physical concepts to explain and study the behavior of crowds, traffic, and similar phenomena. One common method in the field uses the notion of “social forces” to explain the interaction of individual particles such as people or cars. Social forces differ from physical forces, however, in that they do not necessarily follow Newton's Third Law. For example, the optimal distance between two people in conversation varies with culture and individual, so that while one person may be perfectly comfortable, the other person may feel they are too close together or too far apart, thus feeling a repulsive or attractive “force.” The consequences of this type of third-law violation is the subject of our research. Specifically, we investigate a system with two types of particles on a lattice: one species is unaffected by the proximity of other particles, while the other experiences a short-range repulsive force from particles of either type. We compare the characteristics of this model with a similar two-species model in which Newton's Third Law is not violated.

- Prefer Oral Session
 Prefer Poster Session

Scott Hill
sahill@mailaps.org
Southern Methodist University

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