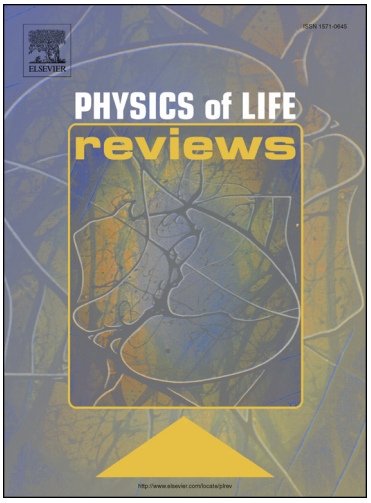
# Accepted Manuscript




Evolutionary game theory using agent-based methods

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## Highlights

- Evolutionary Game Theory can only be treated exactly (mathematically) in limits that are unrealistic for evolving populations
- Agent-based simulations can go beyond mathematics. Using the methods we are able to show that:
  - Realistic populations are in the week selection strong mutation limit, which is not mathematically tractable. Results change dramatically when going from the weak mutation to the strong mutation limit
  - Stochastic strategies can be stable even if the corresponding mixed state is unstable.
  - The encoding of decisions into genetic loci can affect evolutionary trajectories.
  - Stochastic conditional strategies that are stable in the SSWM regime may be unstable in the WSSM regime
  - Punishment in Public Goods Games leads to meta-stable phase transitions and hysteresis