

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

A non-classical phase diagram for virus-bacterial co-evolution mediated by CRISPR. PU HAN, MICHAEL DEEM, Rice University — CRISPR is a newly discovered prokaryotic immune system. Bacteria and archaea with this system incorporate genetic material from invading viruses into their genomes, providing protection against future infection by similar viruses. Due to the cost of CRISPR, bacteria can lose the acquired immunity. We will show an intriguing phase diagram of the virus extinction probability, which when the rate of losing the acquired immunity is small, is more complex than that of the classic predator-prey model. As the CRISPR incorporates genetic material, viruses are under pressure to evolve to escape the recognition by CRISPR, and this co-evolution leads to a non-trivial phase structure that cannot be explained by the classical predator-prey model.

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Date submitted: 06 Nov 2015

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