Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Mutational jackpot events generate effective frequency-dependent selection in adapting populations[1] OSKAR HALLATSCHEK, Univ of California - Berkeley — The site-frequency spectrum is one the most easily measurable quantities that characterize the genetic diversity of a population. While most neutral models predict that site frequency spectra should decay with increasing frequency, a high-frequency uptick has been reported in many populations. Anomalies in the high-frequency tail are particularly unsettling because the highest frequencies can be measured with greatest accuracy. Here, we show that an uptick in the spectrum of neutral mutations generally arises when mutant frequencies are dominated by rare jackpot events, mutational events with large descendant numbers. This leads to an effective pattern of frequency-dependent selection (or unstable internal equilibrium at one half frequency) that causes an accumulation of high-frequency polymorphic sites. We reproduce the known uptick occurring for recurrent hitchhiking (genetic draft) as well as rapid adaptation, and (in the future) generalize the shape of the high-frequency tail to other scenarios that are dominated by jackpot events, such as frequent range expansions. We also tackle (in the future) the inverse approach to use the high-frequency uptick for learning about the tail of the offspring number distribution. Positively selected alleles need to surpass, typically, an u

[1]NSF Career Award (PoLS), NIH NIGMS R01, Simons Foundation

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Date submitted: 11 Nov 2016 Electronic form version 1.4