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An Explanation for Overrepresentation of Tidal Disruption Events in Post-starburst Galaxies

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Tidal disruption events (TDEs) provide a valuable probe in studying the dynamics of stars in the nuclear environments of galaxies. Recent observations show that TDEs are strongly overrepresented in post-starburst or "green valley" galaxies, although the underlying physical mechanism remains unclear. Considering the possible interaction between stars and active galactic nucleus (AGN) disk, the TDE rates can be greatly changed compared to those in quiescent galactic nuclei. We revisit TDE rates by incorporating an evolving AGN disk within the framework of the "loss cone" theory. We numerically evolve the Fokker-Planck equations by considering the star-disk interactions, in-situ star formation in the unstable region of the outer AGN disk and the1 evolution of accretion process for supermassive black holes (SMBHs). We find that the TDE rates are enhanced by about two orders of magnitude shortly after the AGN transitions into a non-active stage. During this phase, the accumulated stars are rapidly scattered into the loss cone due to the disappearance of the inner standard thin disk. Our results provide an explanation for the overrepresentation of TDEs in post-starburst galaxies.

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