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Studying the influence of bars on the $M\sigma$ correlation TANVI DESHMUKH, MONICA VALLURI, University of Michigan — To examine the evolution of galaxies and their supermassive black holes, we look at the relationship between black hole mass, M, and the central velocity dispersion of stars, σ, commonly referred to as the $M\sigma$ correlation. Using data from the cosmological TNG100 simulation, we compare the results of the most popular σ calculation methods when applied to disk galaxies with varying bar strength. We also compare each σ method to the kinetic energy of the stars in the central bulge and make the recommendation that σ measurements which consider both line-of-sight dispersion and mean line-of-sight velocity get closest to accurately representing the galaxy. From here, we move on to analyzing $M\sigma$ and find that TNG100 systematically overestimates M when compared to observational data. However, we can still note differences between barred and unbarred galaxies, indicating that a more accurate relation can be obtained after separating galaxies by bar strength. Finally, we examine $M\sigma$ for samples at increasing redshifts, z, and find that they differ from the correlation at $z = 0$. This implies that if TNG100 represents reality, the $M\sigma$ relationship in disk galaxies at $z = 0$ cannot be used to predict M at higher redshifts.

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