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Growing Supermassive Black Holes: An N-body Mechanic's Perspective[1]

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Astronomers now know that supermassive black holes are a natural part of nearly every galaxy, but how these black holes form, grow, and interact within the galactic center is still a mystery. I will discuss how computational astrophysicists (aka "N-body mechanics") can use N-body simulations to track the interplay between galaxies, dark matter halos, and supermassive black holes. We have discovered that the shape and content of the galaxy influences the evolution of its host black hole, but the effect is not entirely one-sided. Supermassive black holes leave an imprint on the galaxy structure as well, and surprisingly, may even change the structure and kinematics of the intracluster medium where galaxies live. There is more work to be done to uncover how supermassive black holes and galaxies co-exist, and I will talk about what important questions remain.

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