

" Measuring the Stellar Kinematics of the S0 Galaxy NGC 4203 "

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Black holes lie at the centers of every large galaxy, and their masses can be measured in two ways, by modeling the motions of stars or gas. Both methods suffer from different systematic effects, therefore comparisons between the two are important for assessing the consistency of the methods and the effects on the black hole - host galaxy relations. However, there are only a few cases in which a galaxy's black hole mass has been determined using both stellar and gas-dynamical methods. The nearby, S0 galaxy NGC 4203 provides the opportunity to conduct this necessary cross-check. Here we present near infrared adaptive optics observations of NGC 4203 taken with the integral field spectrograph OSIRIS on the Keck II telescope. We measure the velocity, velocity dispersion, and higher-order velocity moments, h_3 and h_4 , within ~ 100 pc of the galaxy's center. We find that the galaxy is rotating, and that there is a drop in velocity dispersion at the nucleus. The stellar kinematics on these small spatial scales are essential for a robust determination of the NGC 4203 black hole mass, which can then be compared to a gas-dynamical determination from existing Hubble Space Telescope observations.