

Cold Quasar Investigation: Comparing Central Star Formation Rates to Black Hole Growth

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A new population of quasars—titled cold quasars—has been discovered that are associated with host galaxies that have a high star formation rate. We aimed to study the host galaxies of 65 of these cold quasars in order to further evaluate their peculiar characteristics. Data was collected from the XMM-XXL survey and cross-matched with the VHS, WISE, and HerMES surveys to obtain multiwavelength data. From the data, we calculated the supermassive black hole's mass using broad emission from the MgII and Hbeta lines. We compared this with the stellar mass of the entire galaxy and find that the black holes are overmassive compared with local relations, indicating that the black hole grows first in entirety before the stellar mass is in place. In addition to this, we created a spectral energy distribution for each galaxy to calculate the star formation rate. We compared the star formation rate with the black hole accretion rate and find that the stellar mass is rapidly increasing at a relative rate faster than the black hole growth, supporting the picture where the black hole grows first.

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