The growth of typical star-forming galaxies and their super massive black holes across cosmic time: consequences for AGN feedback/quenching

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Abstract

Understanding galaxy formation and evolution requires the understanding of both the star formation history (the growth of galaxies) and black hole accretion history (the growth of their black hole), and how they influence each other. Here, we explore a sample of typical Hα-selected star-forming galaxies from the HiZELS survey. We use direct detections but also relying on stacking in the X-rays, far-infrared (FIR) and radio, along with the wealth of multi-wavelength data in COSMOS to study the relative growth between typical galaxies, from z=2.23 to z=0.4, and their black holes. We find that the fraction of AGN increases with Hα luminosity and that the relative black hole to galaxy growth seems to be relatively constant for star forming galaxies since z=2.23. We find a typical fraction of AGN candidates of 20%, although only about 1% were selected through the X-rays. Typical Star Forming galaxies are shown to always be growing their stellar mass much quicker than their black holes (logarithmic ratio of -4) with SFR's of the order of 10 to 100 $M_{\odot}\,yr^{-1}$ and an AGN accretion rate of the order of 10^{-3} $M_{\odot}\,yr^{-1}$. Our results may have important consequences for our understanding of how galaxies like our own evolved in the last 11 Gyrs.