ZFOURGE, the FourStar Galaxy Evolution Survey, is one of the leading surveys probing high-redshift galaxy evolution through infrared observations. This study uses ZFOURGE observations to investigate and extend the infrared luminosity functions and spectral properties of distant galaxies and active galactic nuclei (AGN) to z ~ 6. Our approach uses decomposed SEDs to split galaxy light into star-forming and AGN components. This is crucial for untangling the influence of AGN co-evolution with galaxies and to derive the processes that drive galaxy formation. Using the SED decomposition software, CIGALE, I have generated bolometric infrared luminosity functions, star-formation rate densities, and measured the number density evolution of galaxies and pure AGN. We present the luminosity function of ZFOURGE star-forming galaxies which has effectively eliminated the impact of AGN, enabling more precise measurements. Additionally, we provide pure AGN luminosity functions to luminosities as low as , one of the faintest measurements of AGN luminosity functions published to date. The number density evolution of ZFOURGE star-forming galaxies rapidly declines below for all galaxies. The rate at which number density declines increases with luminosity. AGN galaxies follow the same trend but at a lower initial number density and show an even more rapid decline. Our results offer valuable insights into the evolutionary trends of pure star-forming and AGN galaxies. We probe to higher redshifts and lower luminosities, allowing us to easily constrain the faint end of the luminosity function. In this presentation, I will outline my approach and discuss the broader implications of my findings, emphasising how our results contribute to our understanding of galaxy and AGN evolution across cosmic time.

Hi everyone, my name’s Daniel Lyon and I’m from Queensland University of Technology. My research focuses on leveraging CIGALE, an SED decomposition software, to decompose galaxy light into pure AGN and star-forming components. I create infrared luminosity functions of high-redshift galaxies and AGN using data from the ZFOURGE survey. This analysis provides critical insights into the processes driving galaxy formation and evolution while accounting for the impact of AGN up to redshift 6. My results show LIRG and ULIRG number densities rapidly decline below redshift 2. AGN number density show an even more extreme decline below redshift 2. These findings offer significant constraints on galaxy evolution and AGN co-evolution as well as prove the usefulness of SED decomposition techniques. Feel free to reach out and contact me any time with any comments or questions.