Stellar Populations and Star-Formation Histories of Early-Type Galaxies from the ATLAS^{3D} Survey

R. M. McDermid (Gemini Observatory), K. A. Alatalo, L. Blitz (University of California), M. Bois (ESO, Germany), F. Bournaud (Laboratoire AIM Paris-Saclay, France), M. Bureau, M. Cappellari, R. L. Davies, T. A. Davis (University of Oxford, United Kingdom), P. T. de Zeeuw, E. Emsellem (ESO, Germany), S. Khochfar (Max Planck Institut fur Extraterrestrische Physik, Germany), D. Krajnović, H. Kuntschner (ESO, Germany), P. Lablanche (Observatoire de Lyon, France), R. Morganti (ASTRON, Netherlands), T. Naab (Max-Planck Institut fur Astrophysik, Germany), T. Oosterloo (ASTRON, Netherlands), M. Sarzi (University of Hertfordshire, United Kingdom), N. Scott (University of Oxford, United Kingdom), P. Serra (ASTRON, Netherlands), A.-M. Weijmans (Dunlap Institute for Astronomy & Astrophysics, Canada), L. M. Young (New Mexico Institute of Mining and Technology)

ATLAS^{3D} is a new survey based on integral-field spectroscopy for a complete, volume-limited sample of 260 early-type galaxies observed within the local 40 Mpc volume - the largest survey of its kind. This K-band selected sample spans a range in mass from 10^{10} to 10^{12} $M_{\odot}$, and probes two orders of magnitude in local galaxy density, giving a significantly larger range in mass and environment than previous works of this kind. We present our analysis of the global stellar populations of this sample derived from apertures integrated from our IFU data. These data allow tight control of aperture effects, and give a complete view of the galaxy properties within an effective radius. Trends with mass and other galaxy properties are explored. We find a trend that older galaxies are more compact at a given galaxy mass, and have experienced more rapid star formation at earlier times than younger galaxies of the same mass, as indicated by stellar abundance ratios. This contrasts with a simple picture of downsizing, and suggests additional parameters control the star formation history of these galaxies than only their mass. The trend of size and age is in agreement with recent findings of massive, compact passive galaxies at higher redshifts. We also show preliminary results of non-parametric star-formation histories derived from spectral fitting of our data. These strongly indicate that, despite the presence of young stars and even ongoing star formation, the overwhelming majority of stellar mass in early-type galaxies formed at early epochs, though the assembly into the current systems may have proceeded on different timescales.