Massive Crowded Field Spectroscopy in Globular Clusters and Local Volume Galaxies

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Due to optimized designs, thermal management for the control of dome seeing, and the advent of adaptive optics, the image quality delivered by ground-based telescopes has at least improved by a factor of two, as compared to the state-of-the art of 4m class telescopes some two or three decades ago. As the next step, the outstanding competitive edge of the E-ELT will not only be light-collecting power, but also diffraction-limited image quality, thus opening the opportunity for spectroscopy of resolved stellar populations in nearby galaxies, the galactic center, and globular clusters. In order to address the problem of source confusion for spectroscopy in densely populated fields, we have pioneered PSF-fitting crowded-field integral field spectroscopy using PMAS at the Calar Alto 3.5m telescope. These experiments have yielded extremely encouraging results for individual stars in dense globular cluster fields close to the nucleus (Kamann et al. 2013, 2014). The unprecedented field-of-view and image quality of MUSE has prompted us to employ this technique at the VLT. I shall present work in progress from a MUSE GTO program on the Sculptor Group galaxy NGC300, demonstrating that we now have a tool to perform massive spectroscopic surveys of resolved stellar populations with multiplex factors of order 1000 for any single MUSE field. Future blind surveys using this technique would not only provide us with statistically meaningful samples of stellar spectra, but also with an inventory of all kinds of objects, such as H II regions, planetary nebulae, supernova remnants, and, obviously, unusual objects.