MOSAIC: THE MULTI-OBJECT SPECTROGRAPH FOR THE ESO EXTREMELY LARGE TELESCOPE (FAPESP-NOW 2015)

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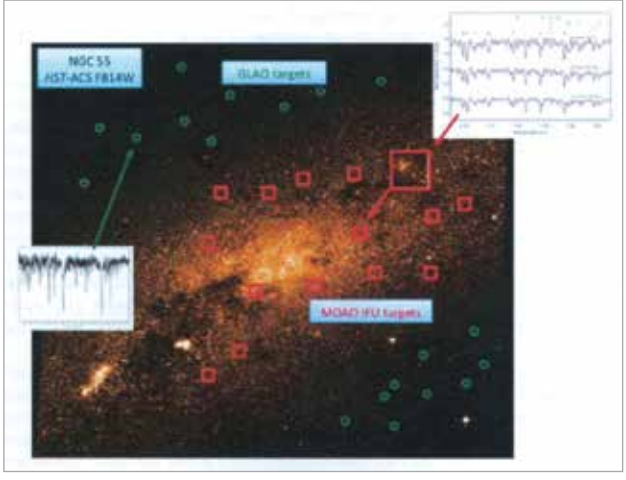

Figure 1. Hubble Space Telescope observation of the spiral galaxy NGC55 at a distance of 2 Mpc just beyond the Local Group [5]. We now have very limited access to the stellar populations of galaxies in the Local Group and beyond. With the E-ELT it will become possible to resolve individual stars in dense stellar populations and obtain spectra with MOSAIC's integral-field units supported by multi-object adaptive optics (MOAO); see red inset for a magnification of the resolved IFU field and corresponding simulated spectra. At the same time, MOSAIC fibers target several hundred point-like objects in the less densely populated field of NGC 55 (green circles, ground-layer adaptive optics). MOSAIC will also study the remnants of the very first population of stars, which are extremely metal poor and remain poorly understood.

With its 39m primary mirror, the ESO Extremely Large Telescope (E-ELT) will be the largest optical/near-infrared telescope ever built. MOSAIC (Multi-Object Spectrograph for Astrophysics, Inter-galactic medium studies and Cosmology) is expected to become the E-ELT´s workhorse instrument for astrophysics, intergalactic medium studies and cosmology in the coming decades. MOSAIC will fully explore the large aperture and superb spatial resolution of the biggest eye on the sky. Key science cases involve searching for extra-galactic planets, resolving stellar populations in thousands of nearby galaxies, and studying high-redshift galaxies at the edge of the visible universe.

MOSAIC is a fiber-fed spectrograph, covering the telescope´s full field of view with several hundred fibers and a dozen integral field units with adaptive optics capability delivering milli-arcsec spatial resolution, providing spectra ranging from the ultraviolet to the near infrared (380 – 2500 nm) at intermediate spectral resolution. The MOSAIC consortium includes scientists from Brazil, France, The Netherlands, and the United Kingdom, as main partners. Another 6 European countries are associated with the consortium at different levels. The Netherlands will be involved in designing and building the MOSAIC spectrographs; Brazil will contribute to its fiber system and spectrograph slit assembly.

This proposal aims to study and develop the fibers to spectrograph interface by producing a prototype slit assemblies for MOSAIC, exchanging expertise between Brazilian and Dutch technicians and industry, and to scientifically explore state-of-art MOS observations to optimize the scientific and technical requirements for MOSAIC.

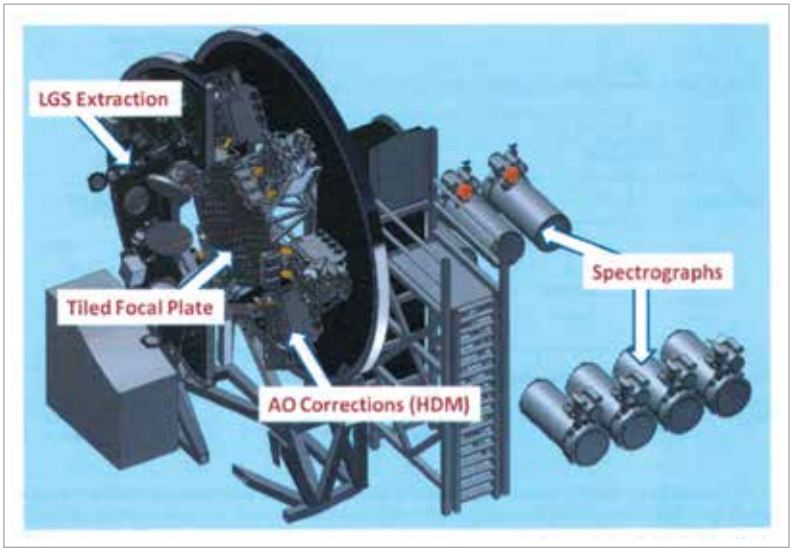

Figure 2. Overall MOSAIC instrument layout on the Nasmyth platform of the E-ELT. The Netherlands will contribute to the design and construction of the spectrographs, Brazil will be involved in the development of the fiber system and slit-unit assembly.

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