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Internal kinematics and stellar populations of early-type galaxies in the Fornax cluster

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Abstract. We present a study of the internal kinematics and stellar populations of early-type galaxies in the Fornax cluster. 10 galaxies in a luminosity range of -21.8$\leqslant M_B \leqslant$-17.4 were observed with the integral field units (IFU) of Gemini South GMOS and VLT-VIMOS. Velocity maps and age-metallicity diagrams are presented for NGC 1404 and NGC 1419.

Keywords. galaxies: elliptical and lenticular, cD, galaxies: individual (NGC 1404, NGC 1419), galaxies: kinematics and dynamics, galaxies: formation

1. Introduction

Early-type galaxies show a variety of kinematic substructure such as nuclear stellar and gaseous discs, kinematically decoupled components (KDC) or minor axis rotation (Emsellem *et al.* 2004). In some of them, signs of secondary star formation have been found. A combination of 2-dimensional kinematics and stellar populations will provide insight into the formation of early-type galaxies.

2. The Fornax IFU survey

Integral field spectroscopy produces two-dimensional velocity fields and line strength distributions of predominantly age and metallicity sensitive indices. For this purpose, we study 9 early-type galaxies in the Fornax cluster and one comparison object with the VIMOS and GMOS IFUs. The wavelength range of the VIMOS and GMOS IFUs includes Hβ and Hγ, allowing an age measurement largely insensitive to metallicity effects. Several Fe indices and Mg line strengths are measured to determine the metallicity and [Mg/Fe] ratio of the stellar populations. In the following, we present first results of the analysis of stellar populations.

3. Results

Fig. 1 shows velocity maps of NGC 1404 and NGC 1419. NGC 1404 has a known decoupled core, and for the first time, such a feature is also detected in NGC 1419. The KDC of NGC 1404 is counterrotating with respect to the main body of the galaxy; NGC 1419 has a rapidly rotating component in the centre, while there is very little rotation in the outer parts.

Fig. 2 shows the line strength indices Hβ vs. MgFe52 overplotted with model predictions of Maraston (2005). Both galaxies show a gradient in metallicity, where the centres are

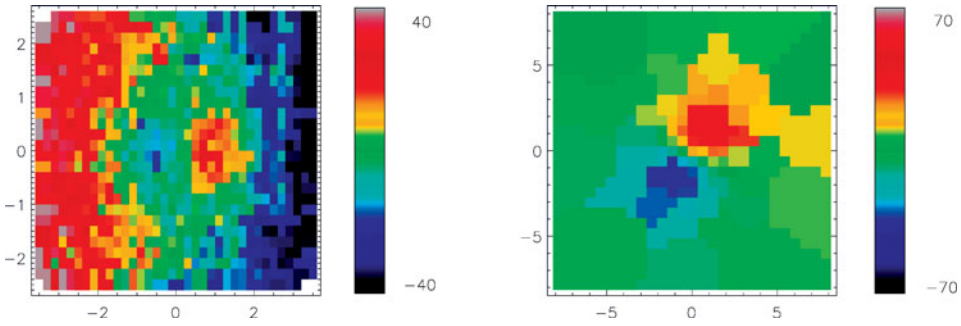

Figure 1. Mean stellar velocity maps of NGC 1404 (left) and NGC 1419 (right). The velocity ranges in kms^{-1} and colour scales are shown to the right of the maps. Both maps are binned to a minimum S/N of 60.

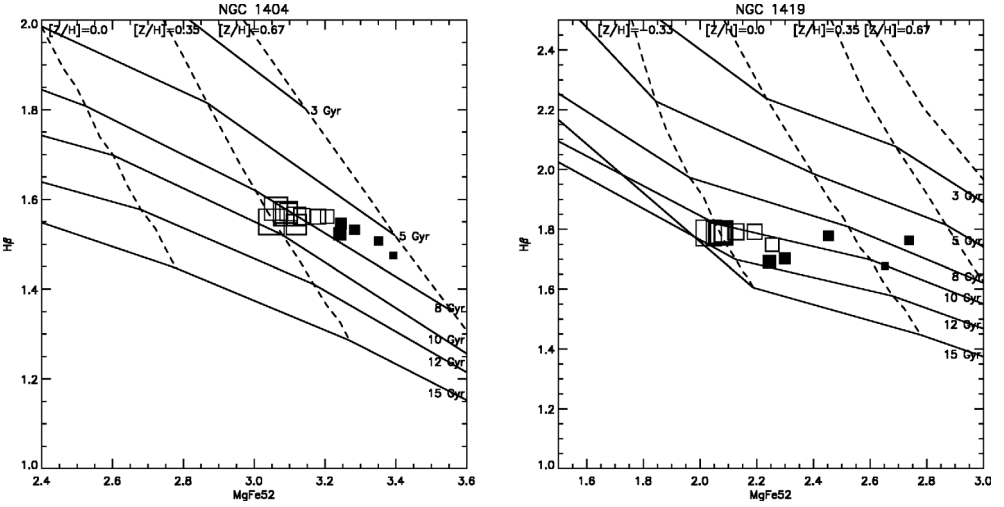

Figure 2. Line strength indices Hβ and MgFe52 in Å overplotted with model predictions of Maraston (2005). Solid and dashed lines represent constant ages and metallicities, respectively; the corresponding ages and metallicities are given at each line. Smaller symbols represent smaller radii; filled and open symbols indicate the KDC and outer parts, respectively.

more metal rich. NGC 1419 has old stellar populations of 8 to 12 Gyr, while the models indicate younger ages between 5 and 8 Gyr in NGC 1404. Both galaxies show mild age gradients with slightly younger ages in the centre, which might be a hint that their KDCs are younger than the main body of the galaxy.

Acknowledgements

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