Star Formation in Nearby Early-Type Galaxies: Mapping in Optical, UV, and CO

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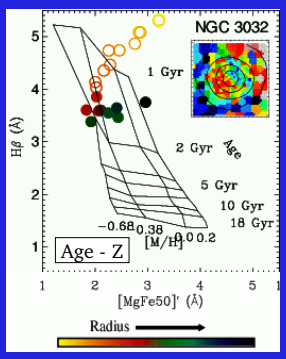
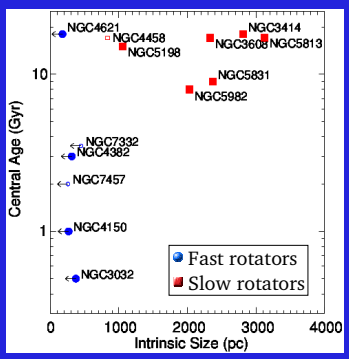
Optical: SAURON

The SAURON integral-field survey reveals a clear dichotomy in the properties of the kinematically decoupled cores (KDCs) found at the center of many early-type galaxies. Small KDCs (100 pc's or $\leq 0.1\ R_e$) such as that in NGC 3032 have clearly distinct stellar populations, increasingly young toward the center, and are typically found in fast-rotating galaxies. Large KDCs (few kpc's or $0.4\ R_e$) have homogeneously old stars and are generally found in non-rotating galaxies.

(McDermid et al., 2006, MNRAS, submitted)

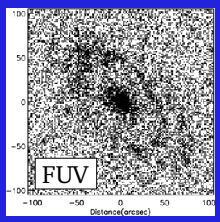


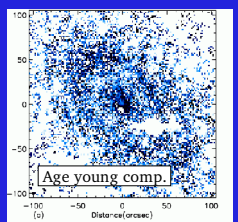


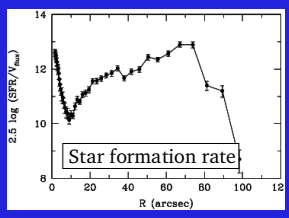
UV: GALEX

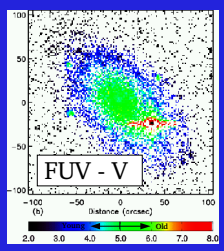
With optical imaging, GALEX NUV and FUV follow-up allow to directly identify regions of recent star formation ($\lesssim 0.5$ Gyr). Simple two-component/two-burst stellar population models further constrain the star formation history. In the elliptical galaxy NGC 2974 for example, young stars are indentified in the center and an outer ring. Given nuclear and inner ionised-gas rings (Krajnovic et al. 2005, MNRAS, 357, 1113; Sarzi et al. 2006, MNRAS, 366, 1151), current star formation surprisingly appears to be driven by a fast bar.

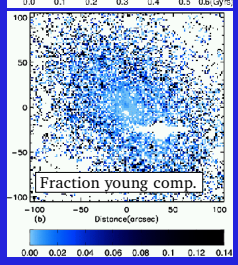
(Jeong et al., 2006, MNRAS, submitted)

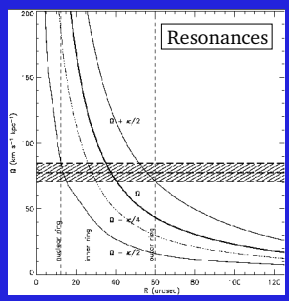








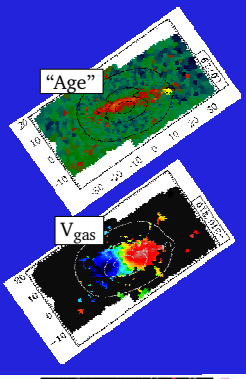




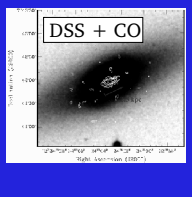
CO: BIMA - IRAM

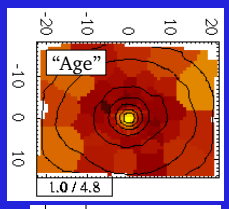
Single-dish CO observations of SAURON early-type galaxies have a detection rate of about 40%. Synthesis imaging follow-up reveals that the molecular gas is typically contained in a well-ordered central disk. This is true of galaxies with both a (young) central stellar disk, such as NGC 4526, or a (young) kinematically decoupled core (KDC), such as NGC 3032. The CO also generally traces very well the ionised gas and young stellar populations. For KDCs however, the CO may or may not share the KDC kinematics.

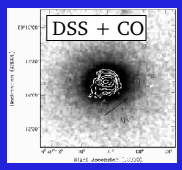
(Young & Bureau, 2006, MNRAS, in preparation)

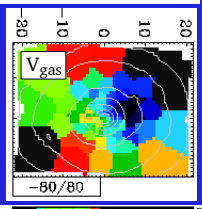


NGC 4526:

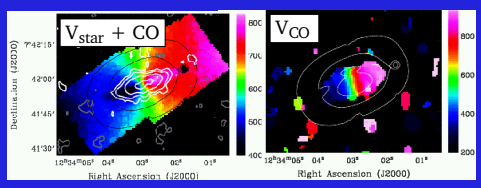


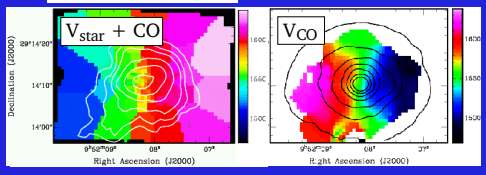






NGC 3032:





(SAURON data: Emsellem et al. 2004, MNRAS, 352, 721; Sarzi et al. 2006, MNRAS, 366, 1151; Kuntschner et al. 2006, MNRAS, 369, 497)