

J-PAS : Low-resolution ($R \sim 50$) spectroscopy covering 8000 deg²

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Abstract. We present the ambitious project J-PAS, that will cover 8000 deg² of the northern sky with 54 narrow-band ($\sim 145\text{\AA}$) contiguous filters, all of them in the optical range (3700 \AA – 9200 \AA). J-PAS will provide a low resolution spectra ($R \sim 50$) in every pixel of the northern sky by 2020, leading to excellent photometric redshifts (0.3% uncertainty) of 100 million sources. J-PAS will permit the study of the 2D properties of nearby galaxies with unprecedented statistics. Some viable studies are the distribution of the star formation rate traced by $H\alpha$, the stellar populations gradients in elliptical galaxies up to a few effective radii, or the impact of environment in galaxy properties. In summary, J-PAS will bring a superb data set for 3D analysis in the local Universe.

Keywords. galaxies: evolution - galaxies: formation

1. The J-PAS

The J-PAS[†] (Javalambre - PAU Astronomical Survey, Benítez *et al.* 2014) will map 8000 deg² of the northern hemisphere with 54 narrow-band ($\sim 145\text{\AA}$) filters from 3700 \AA to 9200 \AA and two extra broad-band filters at the blue and red ends. The depth in these 56 optical bands will be $\sim 22 - 23$ (5σ AB), with a detection limit of $r \sim 23.5$ (5σ AB) performed in a deep broad-band r image. The J-PAS will provide low-resolution ($R \sim 50$) spectra of a hundred million sources from the local Universe up to $z = 3$, leading to excellent photometric redshifts with a precision of $\Delta z/(1+z) \sim 0.3\%$.

The J-PAS will be carried out with the 1.2 Gpixel camera JPCam (Taylor *et al.* 2014), mounted at the 2.55m Javalambre Survey Telescope (JST/T250) at the OAJ (Observatorio Astrofísico de Javalambre, Cenarro *et al.* 2012), a new astronomical facility located in the Pico del Buitre in Teruel, Spain. All the data produced by the OAJ will be reduced, processed, and stored at CEFCA with the UPAD (Unidad de Procesado y Archivo de Datos, Cristóbal-Hornillos *et al.* 2012). The J-PAS final catalogue will comprise 56 bands photometry of a hundred million sources.

J-PAS will address cosmological and galaxy evolution topics, and will complement integral field surveys (IFSs) in the local Universe, such as SAURON (de Zeeuw *et al.* 2002), CALIFA (Sánchez *et al.* 2012), or MaNGA (P. I.: K. Bundy).

2. The 2D study of galaxy properties with J-PAS

The main goals of J-PAS in the local Universe are (i) the 2D study of stellar populations in nearby elliptical galaxies (Fig. 1), (ii) explore the 2D star-formation properties of emission lines galaxies (Fig. 2), and (iii) constrain the impact of environment in the previous items (Fig. 3).

[†] www.j-pas.org

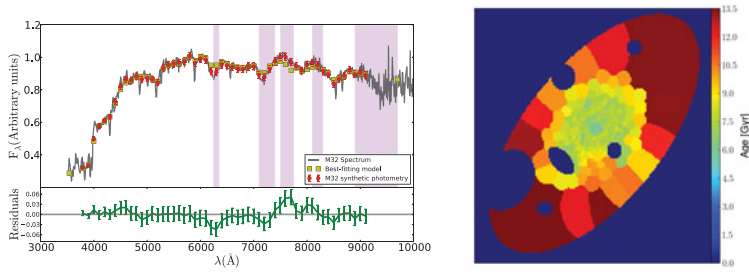


Figure 1. *Left panel:* M32 through the J-PAS glasses (dots) and the best fitting with two stellar populations (squares). The bands mark telluric and sky lines. *Right panel:* The 2D age of a local elliptical galaxy ($z = 0.075$) measured with the ALHAMBRA survey (Moles *et al.* 2008). The outskirts of the galaxy are older than the inner parts.

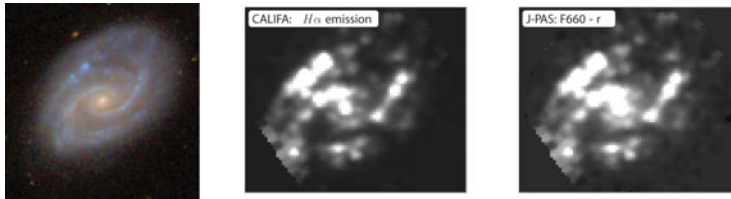


Figure 2. SDSS (Sloan Digital Sky Survey, Aihara *et al.* 2011) colour image of UGC09476 (*left panel*). The $H\alpha$ emission of UGC09476 shown by CALIFA (*central panel*) and the expectation for J-PAS with a narrow vs broad-band image (*right panel*). Relevant information about $H\alpha$, $H\beta$, [OIII], and [OII] lines will be present in the J-PAS photo-spectra.

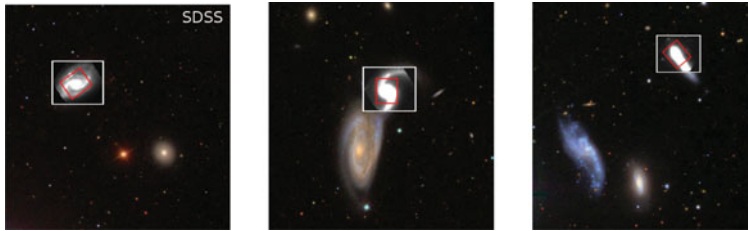


Figure 3. J-PAS will permit the detailed study of environmental effects in galaxy properties. As example, we shown three CALIFA galaxies with close companions. The red squares mark the field-of-view of the SAURON instrument. The coloured images are from SDSS.

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