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**Sesión Científica:** Galaxias y cosmología

**Título:** The ALHAMBRA survey: B-band luminosity function of red and blue galaxies at  $z < 1$  from PDF analysis

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**Resumen:**

The next-generation large-area photometric and spectroscopic surveys will push the current methodologies to the limit, minimising the shot noise and cosmic variance errors and leaving systematic errors as the main source of uncertainty. We present a new methodology to compute accurate and unbiased luminosity functions in photometric redshift surveys. Our new method (i) uses the full probability distribution function (PDF) of the sources in the redshift - template space, (ii) works in real magnitudes thanks to the selection I-band PDF, ensuring 100% complete samples, (iii) statistically deals with red/blue segregations without pre-selection of the sources, (iv) provides the covariance matrix between redshifts and luminosities, including the cosmic variance, (v) consistently derives the associated galaxy bias function thanks to the dispersion of the data, and (vi) performs a 2D fitting in  $z$  - MB space, accounting by volume effects and the errors covariance. We applied our new method to the ALHAMBRA survey data, deriving the B-band luminosity function at  $0.2 < z < 1.0$  both for red and blue galaxies. Our results are in excellent agreement with previous spectroscopic works, confirming the luminosity decline of blue galaxies and the build-up of the red sequence. Moreover, we clearly trace the upturn of faint red galaxies and estimate their contribution to the total luminosity budget. This new methodology will be applied to J-PAS and other photometric redshift surveys in the future.