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**Resumen:**

The evident benefits of Electron Multiplying CCDs (EMCCDs) –speed, high sensitivity, low noise and their capability of detecting single photon events whilst maintaining high quantum efficiency- are bringing these kinds of detectors to many state-of-the-art astronomical instruments. The EMCCDs are the perfect answer to the need for great sensitivity levels as they are not limited by the readout noise of the output amplifier, while conventional CCDs are, even when operated at high readout frame rates. Here we present for the first time a quantitative on-sky method to calibrate EMCCD detectors dedicated to astronomical imaging to give answer to the problems detected with them. The possibility of having regular access to the Canarian telescopes has allowed us to develop this calibration method. The results so obtained will represent a referent to be taken into account for future instruments hosting EMCCD detectors at the Instituto de Astrofísica de Canarias and associated centres.