

# **The faint intergalactic-medium red-shifted emission balloon: future UV observations with EMCCDs**

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## **ABSTRACT**

We present the latest developments in our joint NASA/CNE. This project is a balloon-borne UV multi-object spectrograph, which has been designed to detect faint emission from the circumgalactic medium (CGM) around low red shift galaxies. One major change from FIREBall-1 has been the use of a delta-doped Electron Multiplying CCD (EMCCD). EMCCDs can be used in photon-counting (PC) mode to achieve extremely low readout noise ( $< 1e^-$ ). Our testing initially focused on reducing clock induced charge (CIC) through wave shaping and well depth optimization with the CCD Controller for Counting Photons (CCCP). This optimization includes methods for reducing dark current, via cooling and substrate voltage adjustment. We will present our dark current results from laboratory testing. Furthermore, we will briefly present some initial results from our first set of on-sky observations using our EMCCD on the 200-inch telescope at Palomar, using the Palomar Cosmic Web Imager (PCWI) with a delta-doped EMCCD.

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