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Distance Measurement of the Orphan Chenab Stream Using RR Lyrae Stars

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Stellar streams are trails of stars stripped during the orbit of their progenitor around a host galaxy. They can unveil valuable information about dark matter subhalos, galactic potential, and galactic evolution. In particular, the kink region in the Orphan Chenab (OC) stellar stream is a mark left by a perturbation by the Large Magellanic Cloud (LMC) and offers constraints to the LMC mass measurements. However, the kink region lacks precise distance measurement due to the region being more than 80 kpc away.

With the Gaia catalog, previous studies have mapped the distances to the OC stream with RR Lyrae stars (RRLs) –a class of variable stars with a tight Period-Luminosity relation –but Gaia’s RRLs detections drop beyond 80 kpc. Hence, we propose to use data from the Dark Energy Camera (DECam) to search for the fainter and more distant RRLs in the OC kink region. I will present the multi-epoch photometry performed on said DECam data and plans for RRLs identification, light-curve construction, and pulsation period determination.

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