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Development of a Low Cost Field PIV System for Shallow Environmental Flows AZHER HAMID, STEFANO MAHAIRAS, DAVID MURPHY, SANJIB GURUNG, TRISTEN MEE, None — Field measurements of natural environmental flows can provide new insight into hydrodynamic processes. In contrast to the traditional technique of acoustic Doppler velocimetry, particle image velocimetry (PIV) offers a number of advantages such as the ability to directly calculate vorticity, observe coherent structures, and measure near boundaries. However, the application of PIV to the field has been limited by its expense and complexity. Here we present a novel, low cost PIV system suitable for measuring shallow environmental flows. The system uses multiple continuous wave green waterproof lasers equipped with Powell lenses in 3D-printed mounts to illuminate natural seeding at nighttime within an area up to approximately 1 m x 0.5 m. Two cameras, a Nikon D810 DSLR in an underwater housing and a GoPro 7 Hero, both filming at 60 Hz are tested, thereby providing time-resolved flow field for tens of minutes. All components are mounted on an easily transported, lightweight, aluminum frame. The system is tested in the optically clear waters of the run downstream of Lithia Springs, a second order magnitude freshwater spring in Hillsborough County, FL and is used to measure vertical profiles of instantaneous and mean streamwise velocity extending from the bed to the water surface. -/abstract- Authors: Azher Hamid, Stefano Mahairas, Sanjib Gurung, Tristen Mee, Da

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None

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