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Observations of an Extended Near-Sun Neutral Helium Cloud

Elena Moise (1), Jeff Kuhn (1), and John Raymond (2)

(1) University of Hawai'i, Institute for Astronomy, Honolulu, United States (emoise@ifa.hawaii.edu), (2) Harvard-Smithsonian Center for Astrophysics, Cambridge, United States

We report on sensitive spectropolarimetric observations from the SOLARC coronagraph on Haleakala, Hawai'i. Using our infrared imaging spectropolarimeter, we have detected an extended diffuse surface brightness flux at the 1083 nm wavelength of neutral helium (He I). This has the polarization signature of light scattered by an extended He I cloud in the vicinity of the Sun. Our detailed analysis suggests that this signal originates from an inner source of neutral helium in the solar corona. In this paper, we will present details about these unique observations, their analysis, and physical interpretation.