

Abstract Submitted
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An in vacuo optical polarimeter¹ K.W. TRANTHAM, University of Nebraska - Kearney, T.J. GAY, University of Nebraska - Lincoln — Polarimetric analysis of light is an invaluable tool in understanding processes such as atomic collisions. In such experiments, the interaction of interest is typically in vacuum, whereas the optical polarimeter is situated in the lab, at atmosphere. This arrangement therefore requires a vacuum window. Stress on the window can alter the polarization of the transmitted light. For precise measurements, understanding and controlling this instrumental error is important. A novel, in vacuo optical polarimeter is discussed. By operating the device in vacuum, the need for a vacuum window is eliminated. The design is demonstrated by measuring the Stokes parameters of light from a strongly, linearly-polarized neon lamp. The source is located in its own independent vacuum system, with a collection lens serving as a vacuum barrier between source and polarimeter. While maintaining the polarimeter under vacuum, we present results showing induced circular polarization correlated to light-source pressure, suggesting stress induced birefringence of the lens. Data shows that stressing the lens can change the observed, total polarization by as much as 0.7% of the polarization value itself.

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