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Aspnes

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[54] **MEASUREMENT OF THIN FILMS BY POLARIZED LIGHT**

[75] Inventor: **David Erik Aspnes**, Berkeley Heights, N.J.

[73] Assignee: **Bell Telephone Laboratories, Incorporated**, Murray Hill, N.J.

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[52] **U.S. Cl.** **356/118**; 356/119
[51] **Int. Cl.**[2] **G01N 21/40**
[58] **Field of Search** 356/114–118, 356/30–31, 33–35; 250/225

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Primary Examiner—John K. Corbin
Assistant Examiner—Wm. H. Punter
Attorney, Agent, or Firm—D. I. Caplan

[57] **ABSTRACT**

In order to measure the thickness and refractive index of a thin film on a substrate, such as a film of silicon dioxide on a substrate of silicon, a beam of substantially monochromatic polarized light is directed on the film. The reflected light is transmitted through an optical compensator and an optical analyzer both of which are rotating at different angular speeds, ω_A and ω_C, respectively; and the transmitted optical intensity is measured as a function of time. A Fourier analysis, for example, of the profile of this optical intensity vs. time can then be used for determining the Stokes parameters of the light reflected by the thin film and thereby also the thickness and refractive index of the film.

13 Claims, 2 Drawing Figures