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(21) International Application Number: PCT/US96/18723 (22) International Filing Date: 22 November 1996 (22.11.96) (30) Priority Data: 08/562,876 27 November 1995 (27.11.95) US (71) Applicant: SCHMITT MEASUREMENT SYSTEMS, INC. [US/US]; 2765 N.W. Nicolai Street, Portland, OR 97210 (US). (72) Inventors: SCHIFF, Tod, F.; 16315 N.W. Charlais Street, Beaverton, OR 97006 (US). BERNT, Marvin, L.; 422 Central Avenue, Whitefish, MT 59937 (US). (74) Agents: ROBERTS, Charles, L. et al.; Madson & Metcalf, Suite 950, 170 South Main Street, Salt Lake City, UT 84101 (US).		(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, <u>SG</u> , SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>

(54) Title: METHODS AND APPARATUS FOR CHARACTERIZING A SURFACE**(57) Abstract**

A system (10) and method for characterizing a surface are disclosed. The system (10) includes a light source (14) and source optics (18) which direct a beam of light (16) toward the surface (12). A first optical integrating device (30) is positioned and configured to receive a first portion of the scattered light (24) which corresponds to a first range of spatial frequencies. A second optical integrating device (40) is positioned and configured to receive a second portion of the scattered light corresponding to a second range of spatial frequencies. In one embodiment, an integrating sphere is employed as the first optical integrating device. The sphere includes a sampling aperture (34) which is surrounded by a light absorption region (62) on the interior of the sphere. Total integrated scatter data is generated for each range of spatial frequencies and is used to approximate the spectral scatter function of the surface. RMS roughness is then approximated for any range of spatial frequencies.

