

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
28 February 2008 (28.02.2008)

PCT

(10) International Publication Number
WO 2008/024825 A2

(51) International Patent Classification:
G01N 23/20 (2006.01)

(21) International Application Number:
PCT/US2007/076497

(22) International Filing Date: 22 August 2007 (22.08.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/823,328 23 August 2006 (23.08.2006) US

(71) Applicant (for all designated States except US): **AMERICAN SCIENCE AND ENGINEERING, INC.** [US/US];
829 Middlesex Turnpike, Billerica, MA 01821 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **ROTHSCHILD, Peter, J.** [AU/US]; 261 Beacon Street, Apt. #1, Boston, MA 02116 (US).

(74) Agents: **MURPHY, Timothy, M.** et al.; Bromberg & Sunstein, LLP, 125 Summer Street, Boston, MA 02110 (US).

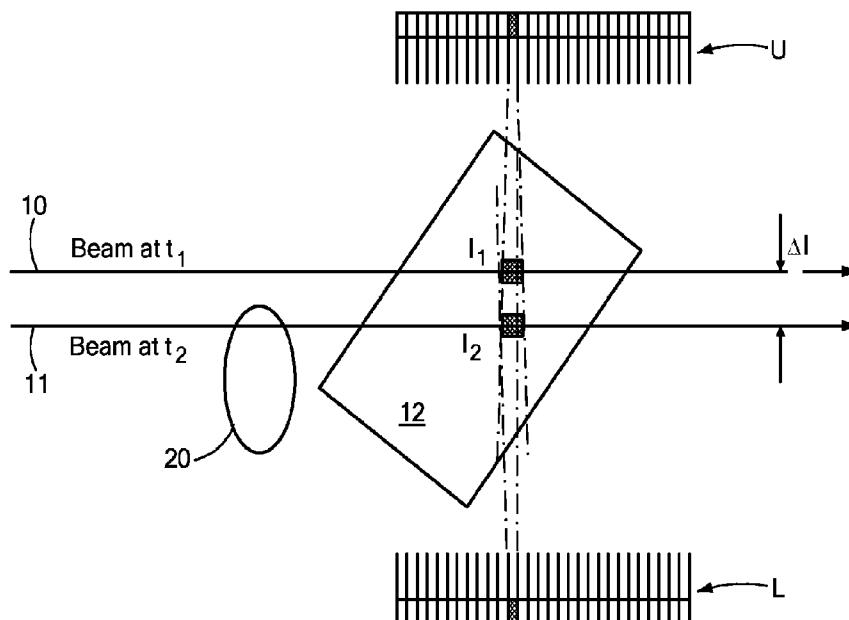
(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished upon receipt of that report

(54) Title: SCATTER ATTENUATION TOMOGRAPHY



(57) Abstract: Methods for characterizing an inspected object on the basis of attenuation determined from pair-wise illuminated voxels. A beam of penetrating radiation characterized by a propagation direction and an energy distribution is scanned across an object, while scatter detectors with collimated fields-of-view detect radiation scattered by each voxel of the inspected object that is intercepted by the incident beam of penetrating radiation. By calculating the attenuation of penetrating radiation between pairs of voxels of incidence of the incident beam, a tomographic image is obtained characterizing the three-dimensional distribution of attenuation in the object of one or more energies of penetrating radiation, and thus of various material characteristics.