

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
09 December 2021 (09.12.2021)



(10) International Publication Number
WO 2021/247485 A1

(51) International Patent Classification:

G02B 26/00 (2006.01) G02B 27/00 (2006.01)
G02B 26/08 (2006.01)

(21) International Application Number:

PCT/US2021/035126

(22) International Filing Date:

01 June 2021 (01.06.2021)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

16/889,706 01 June 2020 (01.06.2020) US

(71) Applicant: **LOCKHEED MARTIN CORPORATION**
[US/US]; 6801 Rockledge Drive, Bethesda, Maryland
20817 (US).

(72) Inventor: **BUCK, Joseph Robert**; 760 E. Wiggins St., Su-
perior, Colorado 80027-8011 (US).

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

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,

GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ,
UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,
TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,
EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,
MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
KM, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: GEOMETRIC PHASE AND OFF-AXIS OPTICS FOR REDUCED BACKSCATTER

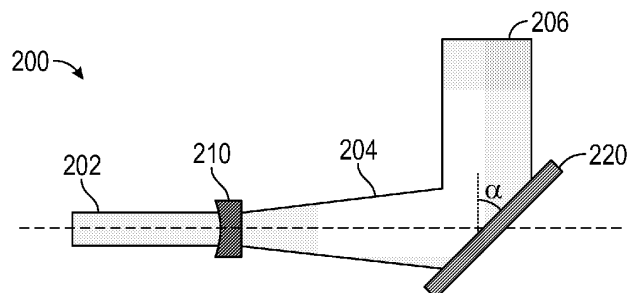


FIG. 2

(57) Abstract: An off-axis optical system includes an optical source to generate a light beam and an off-axis optical element arranged at a first angle with respect to a normal to the light beam. The off-axis optical element deflects the light beam onto a target. The off-axis optical element can be a thin-film reflective element having a combined deflection and lens profile.



WO 2021/247485 A1