



- (51) International Patent Classification:
H01S 3/091 (2006.01)
- (21) International Application Number:
PCT/US2024/014614
- (22) International Filing Date:
06 February 2024 (06.02.2024)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
63/483,435 06 February 2023 (06.02.2023) US
18/460,477 01 September 2023 (01.09.2023) US
- (71) Applicant: **XSCAPE PHOTONICS** [US/US]; 256 W
116th Street, Floor 3, New York, New York 10026 (US).
- (72) Inventors: **OKAWACHI, Yoshimoto**; 212 Woodland
Ave., River Edge, New Jersey 07661 (US). **NOVICK, Ash-
er**; 1112 44th Drive, Unit 2C, Long Island City, New York
11101 (US). **KARIMELAHI, Samira**; 116 Via De Tesoros,
Los Gatos, California 95032 (US). **GAETA, Alexander**;
452 Riverside Dr., Apt. 62, New York, New York 10027
(US). **RAGHUNATHAN, Vivek**; 801 W El Camino Real,
Apt 1210, Mountain View, California 94040 (US).
- (74) Agent: **PAOLETTA, Therese** et al.; Fish & Richardson
P.C., P. O. Box 1022, Minnesota, Minnesota 55440-1022
(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, CV, CZ, DE, DJ, DK, DM,
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG,

(54) Title: WAVELENGTH GENERATOR BASED ON RING RESONATOR PHOTONIC DEVICES

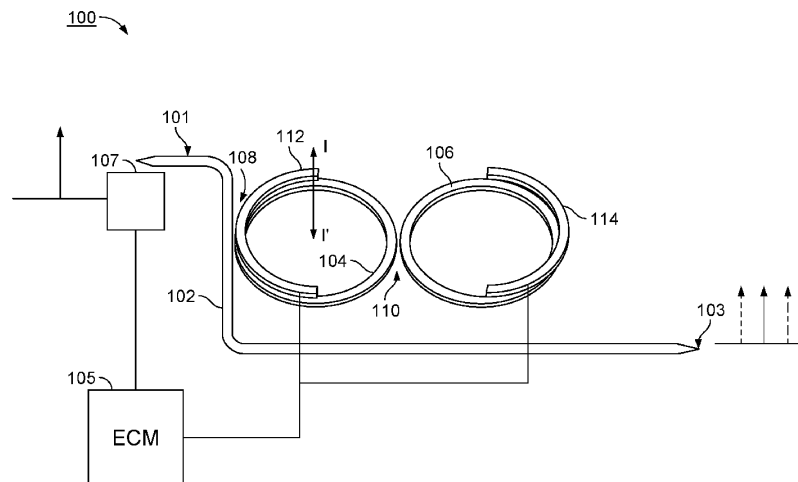


FIG. 1

(57) Abstract: A device includes: a wavelength generator configured to output optical signals at a pump frequency and at first and second frequencies both different from the pump frequency, the wavelength generator including: a planar bus waveguide; a main ring resonator; a first heating element thermally coupled to the main ring resonator; an auxiliary ring resonator optically coupled to the main ring resonator; and a second heating element thermally coupled to the auxiliary ring resonator; and an electronic control module in communication with the first heating element and the second heating element, the electronic control module being programmed to control a detuning of a main ring resonance frequency from the pump signal frequency via the first heating element, and to control a spectral position of an auxiliary ring resonance frequency to produce optical signals at the first and second frequencies from the optical signal at the pump frequency.

[Continued on next page]

KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY,
MA, MD, MG, MK, MN, MU, 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, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, 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, ME, 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).

Declarations under Rule 4.17:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

Published:

— *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*