

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
05 May 2022 (05.05.2022)



(10) International Publication Number
WO 2022/090621 A1

(51) International Patent Classification:
G06N 10/40 (2022.01) *H01L 39/22* (2006.01)
H01L 27/18 (2006.01) *H01P 7/08* (2006.01)

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).

(21) International Application Number:
PCT/FI2021/050718

Declarations under Rule 4.17:

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

(22) International Filing Date:
26 October 2021 (26.10.2021)

Published:

— with international search report (Art. 21(3))
— before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments (Rule 48.2(h))

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
20204967.2 30 October 2020 (30.10.2020) EP

(71) Applicant: IQM FINLAND OY [FI/FI]; Keilaranta 19,
02150 Espoo (FI).

(72) Inventors: HEINSOO, Johannes; c/o IQM Finland Oy,
Keilaranta 19, 02150 Espoo (FI). OCKELOEN-KORPPI,
Casper; c/o IQM Finland Oy, Keilaranta 19, 02150 Espoo
(FI).

(74) Agent: PAPULA OY; P.O. Box 981, 00101 Helsinki (FI).

(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,

(54) Title: TUNABLE COUPLER WITH COUPLING EXTENSION

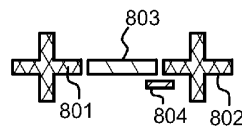


Fig. 12

(57) Abstract: A tunable coupler is provided for making a controllable coupling to at least a first qubit (801). It comprises a first constant coupling element (803) and a tunable coupling element (804). Said first constant coupling element (803) forms a non-galvanic coupling interface to at least said first qubit (801) at a first extremity that is distant from said tunable coupling element (804). Said tunable coupling element (804) is located adjacent to a non-galvanic coupling interface formed between the first constant coupling element (803) and a further circuit element (802) at a second extremity thereof.

WO 2022/090621 A1