(12) 按照专利合作条约所公布的国际申请

(19) 世界知识产权组织
国 际 局

(43) 国际公布日
2025 年 9 月 12 日 (12.09.2025)

WIPO | PCT

(10) 国际公布号
WO 2025/185307 A1

(51) 国际专利分类号:
G02B 6/126 (2006.01) *G02B 6/28* (2006.01)
G02B 6/124 (2006.01)

(21) 国际申请号: PCT/CN2024/141858

(22) 国际申请日: 2024 年 12 月 24 日 (24.12.2024)

(25) 申请语言: 中文

(26) 公布语言: 中文

(30) 优先权:
202420440975.5 2024年3月7日 (07.03.2024) CN

(71) 申请人: 苏州湃矽科技有限公司 **(PICMORE TECHNOLOGY (SUZHOU) LTD.)** [CN/CN]; 中国江苏省苏州市工业园区胜浦路 168 号 3 幢 E栋3层 215127 (CN)。

(72) 发明人:李晨光**(LI, Chenguang)**; 中国江苏省苏州市工业园区胜浦路168号3幢E栋3层 215127 (CN)。
郭德汾**(GUO, Defen)**; 中国江苏省苏州市工业园区胜浦路168号3幢E栋3层 215127 (CN)。 李显尧**(LI, Xianyao)**; 中国江苏省苏州市工业园区胜浦路168号3幢E栋3层 215127 (CN)。

(81) 指定国(除另有指明，要求每一种可提供的国家保护): 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, 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) 指定国(除另有指明，要求每一种可提供的地区保护): ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ,

(54) **Title:** ON-CHIP INTEGRATED WAVELENGTH DIVISION MULTIPLEXER AND PHOTONIC INTEGRATED CIRCUIT CHIP

(54) 发明名称: 片上集成波分复用器及光子集成电路芯片

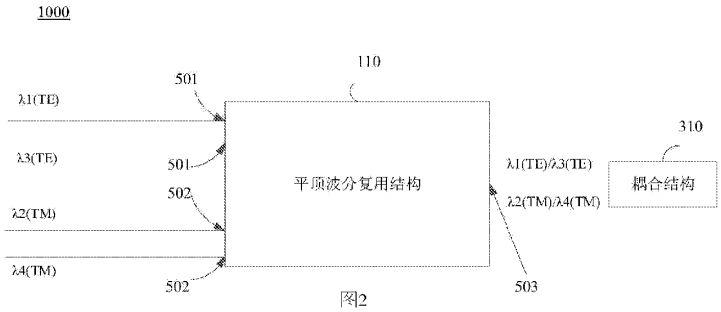


图2

110 FLAT-TOP WAVELENGTH DIVISION MULTIPLEXING STRUCTURE
310 COUPLING STRUCTURE

(57) **Abstract:** Disclosed in the present application are an on-chip integrated wavelength division multiplexer and a photonic integrated circuit chip. The wavelength division multiplexer comprises a polarization-insensitive flat-top wavelength division multiplexing structure, wherein the flat-top wavelength division multiplexing structure has a first input waveguide group, a second input waveguide group and an output waveguide. In the flat-top wavelength division multiplexing structure, odd-even grouping is performed on central wavelengths configured for the first input waveguide group and the second input waveguide group, optical signals of different groups are respectively input into the wavelength division multiplexer in different polarization states, and on the basis of a single polarization-insensitive flat-top wavelength division multiplexing structure, two groups of multiple optical signals of different wavelengths and in different polarization states are multiplexed into one multi-wavelength and polarization multiplexed light, thereby reducing signal crosstalk between adjacent channels, simplifying the structural complexity of the wavelength division multiplexer, reducing the size of the wavelength division multiplexer, and thus facilitating an improvement in the integration level of the photonic integrated circuit chip.

WO 2025/185307 A1

[见续页]

NA, RW, SC, SD, SL, ST, SZ, TZ, UG, ZM, ZW), 欧亚 (AM, AZ, BY, KG, KZ, RU, TJ, TM), 欧洲 (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)。

根据细则4.17的声明:
— 关于发明人身份(细则4.17(i))
— 关于申请人有权申请并被授予专利(细则4.17(ii))
— 发明人资格(细则4.17(iv))

本国际公布:
— 包括国际检索报告(条约第21条(3))。

(57) 摘要: 本申请公开了一种片上集成波分复用器及光子集成电路芯片，其中，波分复用器包括一个偏振兼容的平顶波分复用结构，该平顶波分复用结构具有第一输入波导组、第二输入波导组和一个输出波导，由于该平顶波分复用结构对第一输入波导组、第二输入波导组被配置的中心波长进行了奇偶分组，且使不同分组的光信号分别以不同的偏振态输入波分复用器，并基于单个偏振兼容的平顶波分复用结构将两组不同偏振态的多路不同波长的光信号复用为一路多波长-偏振复用光，降低了相邻通道间的信号串扰，且简化了波分复用器的结构复杂度和尺寸，利于提高光子集成电路芯片的集成度。