

Title (en)  
COMBINING DEVICE AND OPTICAL SYSTEM

Title (de)  
KOMBINATIONSEINRICHTUNG UND OPTISCHES SYSTEM

Title (fr)  
DISPOSITIF DE COMBINAISON ET SYSTÈME OPTIQUE

Publication  
**EP 4327420 A2 20240228 (DE)**

Application  
**EP 22773589 A 20220422**

Priority  
• DE 102021204057 A 20210423  
• EP 2022060685 W 20220422

Abstract (en)  
[origin: WO202223761A1] The invention relates to a superposition device (5) for the coherent superposition of four mutually coherent input beams (1 to 4) to form one output beam (6), comprising: four inputs (E1 to E4), each for one of the input beams (1 to 4) to enter; one output (A) for the output beam (6) to exit; a first combination device (K1) for the coherent combination of the first input beam (1) and the second input beam (2) to form a first superposition beam (U1); a second combination device (K2) for the coherent combination of the third input beam (3) and the fourth input beam (4) to form a second superposition beam (U2); as well as a third combination device (K3) for forming the output beam (6) by the coherent combination of the first superposition beam (U1) and the second superposition beam (U2); wherein the superposition device (5) is designed to adjust both a polarisation state, in particular a polarisation direction (R), and a power (PA) of the output beam (6) independently of one another and according to relative phase positions ( $\Delta\phi_{12}$ ;  $\Delta\phi_{34}$ ;  $\Delta\phi_{12,34}$ ) of the individual phases ( $\phi_1$ ,  $\phi_2$ ,  $\phi_3$ ,  $\phi_4$ ) of the input beams (1 to 4) which have been fed to the four inputs (E1 to E4), in relation to one another. The invention also relates to an optical system comprising: a beam source for generating a laser beam; a splitting device for splitting the laser beam among the four mutually coherent input beams (1 to 4); a phase-modulation device for modulating the relative phase positions ( $\Delta\phi_{1,2}$ ,  $\Delta\phi_{2,3}$ ,  $\Delta\phi_{12,34}$ ) of the four input beams (1 to 4); and a superposition device (5) which is designed as described above, for the coherent superposition of the four input beams (1 to 4) to form the output beam (6).

IPC 8 full level  
**H01S 3/10** (2006.01); **G02B 27/14** (2006.01); **G02B 27/28** (2006.01)

CPC (source: EP US)  
**G02B 27/144** (2013.01 - EP US); **G02B 27/281** (2013.01 - EP US); **G02B 27/283** (2013.01 - EP US); **G02B 27/286** (2013.01 - EP US); **H01S 3/0057** (2013.01 - EP); **H01S 3/0071** (2013.01 - EP); **H01S 3/1307** (2013.01 - EP); **H01S 3/2308** (2013.01 - EP); **H01S 3/2383** (2013.01 - EP)

Designated contracting state (EPC)  
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

Designated extension state (EPC)  
BA ME

Designated validation state (EPC)  
KH MA MD TN

DOCDB simple family (publication)  
**DE 102021204057 A1 20221027**; CN 117178442 A 20231205; CN 117178443 A 20231205; EP 4327419 A1 20240228; EP 4327420 A2 20240228; US 2024045222 A1 20240208; US 2024045223 A1 20240208; WO 202223761 A1 20221027; WO 202223780 A2 20221027; WO 202223780 A3 20221215

DOCDB simple family (application)  
**DE 102021204057 A 20210423**; CN 202280029848 A 20220422; CN 202280030218 A 20220422; EP 2022060657 W 20220422; EP 2022060685 W 20220422; EP 22725181 A 20220422; EP 22773589 A 20220422; US 202318489877 A 20231019; US 202318489885 A 20231019