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(54) Title: COHERENTLY PHASE COMBINED, HIGH CONTRAST, PULSED OPTICAL FIBER AMPLIFIER ARRAY

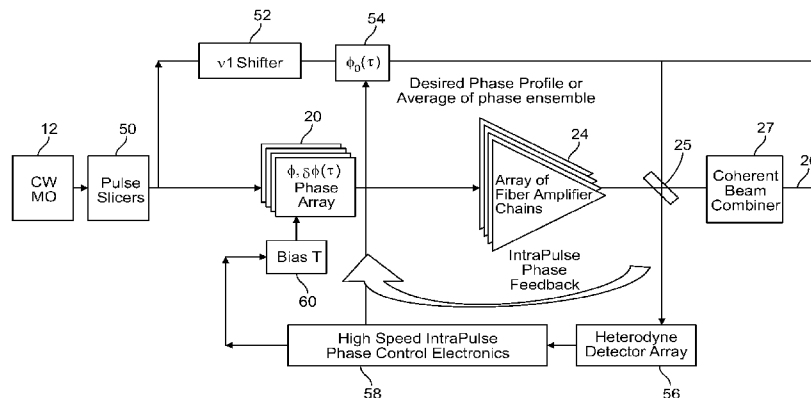
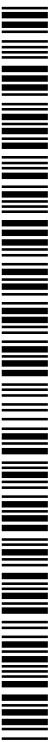


FIG. 3

(57) Abstract: A pulsed fiber array laser system that has actively stabilized coherent beam combination (CBC) is disclosed. The active stabilization is accomplished using both piston phase control and intra-pulse phase control, allowing a much greater increase in pulse energy. Further stabilization using intra-pulse amplitude control is also disclosed. A chirp profile can be written on the output pulse to enable specific applications. An amplitude profile of the amplifier array may optionally be tailored to match to a reference electrical pulse. Using the current invention, a much smaller number of amplifier chains will be needed to achieve certain pulse energy, resulting in a system with lower complexity, lower cost, smaller size, less weight, and higher reliability. A frequency shifted (52) part of the input pulse is phase controlled (54) and used for heterodyne detection (56) together with part of the in the fiber amplifier (24) amplified leaking light between the pulses. The phase in each of the parallel amplification lines (24) is controlled with a phase controller (20) using high-speed electronics.



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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
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B. FIELDS SEARCHED
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 EPO-Internal, COMPENDEX, INSPEC, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	STEPHEN PALESE ET AL: "Coherent combining of pulsed fiber amplifiers in the nonlinear chirp regime with intra-pulse phase control", OPTICS EXPRESS, vol. 20, no. 7, 26 March 2012 (2012-03-26), page 7422, XP55098737, ISSN: 1094-4087, DOI: 10.1364/OE.20.007422	1,4-6, 8-12, 15-17
Y	page 7423, paragraph 1 - page 7435, paragraph 2; figures 1,2,4,6 ----- -/--	2,3,7, 13,14

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Laenen, Robert
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INTERNATIONAL SEARCH REPORT

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>BOURDON PIERRE ET AL: "Coherent combining of low-peak-power pulsed fiber amplifiers with 80-ns pulse duration", FIBER LASERS VIII: TECHNOLOGY, SYSTEMS, AND APPLICATIONS, SPIE, 1000 20TH ST. BELLINGHAM WA 98225-6705 USA, vol. 7914, no. 1, 10 February 2011 (2011-02-10), pages 1-7, XP060010528, DOI: 10.1117/12.875165 [retrieved on 1901-01-01] pages 79140w-2 - pages 79140w-6; figures 1,2,6,7</p> <p style="text-align: center;">-----</p>	2,3,7, 13,14
Y	<p>LOMBARD L ET AL: "Coherent beam combination of pulse fiber amplifiers in 100ns-pulse regime", LASERS AND ELECTRO-OPTICS EUROPE (CLEO EUROPE/EQEC), 2011 CONFERENCE ON AND 12TH EUROPEAN QUANTUM ELECTRONICS CONFERENCE, IEEE, 22 May 2011 (2011-05-22), page 1, XP031954973, DOI: 10.1109/CLEOE.2011.5943118 ISBN: 978-1-4577-0533-5 page 1; figure 1</p> <p style="text-align: center;">-----</p>	2,3,7, 13,14