CLAIMS

1. A laser system comprising:

a seed laser;

a laser beam splitting and combining subsystem receiving an output from said seed laser and providing a combined laser output, said laser beam splitting and combining subsystem varying a phase of said combined laser output;

a plurality of detectors detecting said combined laser output at intermittent times during said varying of said phase of said combined laser output; and

a plurality of optical pathways between said combined laser output and said plurality of detectors for providing therealong said combined laser output to said plurality of detectors, a spatial density of said plurality of optical pathways being greater than a spatial density of said plurality of detectors;

wherein said combined laser output has noise and wherein said laser system also comprises a noise cancellation subsystem operative to provide a noise cancellation phase correction output based on taking into consideration said noise of said combined laser output, as detected by said plurality of detectors at said intermittent times during said varying of said phase of said combined laser output.

2. The laser system according to claim 1, wherein said laser beam splitting and combining subsystem varies said phase of said combined laser output at time interstices between said intermittent times.

3. The laser system according to claim 1, wherein said laser beam splitting and combining system varies said phase of said combined laser output at a phase varying rate which exceeds a rate at which noise of said combined laser output is taken into consideration, as said noise is detected by said plurality of detectors at said intermittent times.

4. The laser system according to any of claims 1 - 3, wherein said plurality of optical pathways comprises a plurality of optical fibers, ends of said optical fibers

being arranged with said spatial density greater than said spatial density of said plurality of detectors.

5. The laser system according to any of claims 1 - 4, wherein ones said plurality of optical pathways are interspaced by a distance of 20 - 1000 microns.

6. The laser system according to claim 5, wherein ones of said plurality of detectors are interspaced by a distance of 5 - 50 mm.

7. A method for detecting a laser output comprising:

receiving an output from a seed laser;

splitting and combining said output to provide a combined laser output;

varying a phase of said combined laser output; and

providing said combined laser output to a plurality of detectors along a plurality of optical pathways, a spatial density of said plurality of optical pathways being greater than a spatial density of said plurality of detectors;

wherein said combined laser output has noise and wherein said method also comprises providing a noise cancellation phase correction output based on taking into consideration said noise of said combined laser output, as detected by said plurality of detectors at intermittent times during said varying of said phase of said combined laser output.

8. The method according to claim 7, wherein said varying of said phase is performed during time interstices between said intermittent times.

9. The method according to claim 7 or claim 8, wherein said varying of said phase of said combined laser output is performed at a phase varying rate which exceeds a rate at which said noise of said combined laser output is taken into consideration, as said noise is detected by said plurality of detectors at said intermittent times.

10. The method according to any of claims 7-9, wherein said plurality of optical pathways comprises a plurality of optical fibers, ends of said optical fibers being arranged with said spatial density greater than said spatial density of said plurality of detectors.

11. The method according to any of claims 7 - 10, wherein ones said plurality of optical pathways are interspaced by a distance of 20 - 1000 microns.

12. The method according to claim 10, wherein ones of said plurality of detectors are interspaced by a distance of 5 - 50 mm.

13. The laser system according to claim 1, said laser beam splitting and combining subsystem splitting said output from said seed laser into a plurality of sub-beams and providing a combined laser output comprising said plurality of sub-beams;

said laser system also comprising a phase modulation subsystem grouping at least a portion of ones of said plurality of sub-beams into a multiplicity of groups of sub-beams, said phase modulation subsystem:

in parallel across said multiplicity of groups of sub-beams, varying a phase of each sub-beam within each group relative to phases of other sub-beams within said group so as to vary a phase of each group, and

varying said phase of each group relative to phases of other ones of said multiplicity of groups, thereby varying said phase of said combined laser output.

14. The laser system according to claim 13, and wherein said phase modulation subsystem comprises a multiplicity of detectors corresponding to said multiplicity of groups, for detecting a far field intensity pattern of each of said multiplicity of groups.

15. The laser system according to claim 14, wherein each detector of said multiplicity of detectors comprises said plurality of detectors.

16. The laser system according to claim 15, said plurality of optical pathways being provided between said far field intensity pattern of each of said multiplicity of groups and each plurality of detectors for providing said far field intensity pattern therealong to said plurality of detectors, said spatial density of said plurality of optical pathways being greater than said spatial density of said plurality of detectors.

17. The laser system according to claim 1, wherein said varying of said phase of said combined laser output provides spatial modulation of said combined laser output.

18. The laser system according to claim 17, wherein said spatial modulation by said varying of said phase is provided in combination with mechanical spatial modulation, said spatial modulation in combination with said mechanical spatial modulation being faster than said mechanical spatial modulation in the absence of said spatial modulation by said varying of said phase.