

8. A pulse laser device as in claim 1 wherein said laser amplifier means comprises a two-pass Nd:YAG laser amplifier pumped by a pumping means.

9. A pulse laser device as in claim 8 wherein said pumping means comprises a plurality of laser diode arrays.

10. A pulse laser device as in claim 8 wherein said pumping means comprises a flash lamp.

11. A pulse laser device as in claim 1 wherein said laser means comprises a Nd:YAG polished rod pumped by a plurality of laser diode arrays.

12. A pulse laser device as in claim 11 wherein said laser diode arrays are programmed to operate in CW.

13. A pulse laser device as in claim 11 wherein said plurality of laser diode arrays are programmed to operate at a duty factor of less than 100 percent.

14. A pulse laser device as in claim 13 wherein said duty factor is about 20 percent.

15. A pulse laser device as in claim 14 wherein said amplified pulse laser beam comprises a series of periodically spaced high frequency pulses.

16. A pulse laser device as in claim 1, and further comprising a target for the production of X-rays upon illumination at said small spots.

17. A pulse laser device as in claim 16 wherein said target is comprised of a metal.

18. A pulse laser device as in claim 17 wherein said metals is chosen from a group comprised of copper and iron.

19. A pulse laser device as in claim 1 and further comprising a frequency increasing means placed in the amplified beam for increasing the frequency of the amplified beam.

20. A pulse laser device as in claim 19 wherein said frequency increasing means is a harmonic generator.

21. A high average power, high brightness solid state pulse laser device comprising:

- a) a mode locked Nd:YAG laser oscillator for producing a first pulse laser beam with a high pulse frequency,
- b) a pulse spacing selector means for removing from said first pulse laser beam more than 80 percent of the pulses in said beam to produce a second pulse laser beam comprising a series of periodically spaced high frequency pulses in excess of 1,000 pulses per second,
- c) a two-pass, diode pumped, Nd:YAG laser amplifier means for amplifying said expanded pulse laser beam to produce an amplified pulse laser beam with an average power in the range of about 1 KW, said beam comprising high frequency pulses,
- e) a focusing means for focusing said amplified pulse laser beam to a small spot size on a target, said spot size being small enough to produce a brightness level in excess of 10^{11} W/cm².

22. A pulse laser device as in claim 21 and further comprising a beam steering means for rapidly steering said amplified pulse laser beam relative to said target so as to simulate a spot size larger than said small spot.

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