

Two-colors mixed petawatt laser designed for fast ignition experiment

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Here we report a novel design of a heating laser for the fast ignition, combining fundamental and second harmonics lights. Such a two-colors laser is expected to heat a dense core more efficiently than a laser only with a fundamental light. We chose a LBO (LiB₃O₅) crystal which can convert a focusing beam due to its large acceptance of phase matching angle. We experimentally demonstrated the second harmonic conversion with efficiency of 60% at the maximum. The LBO crystal shows a high damage threshold more than 5 J/cm² with a down-scale LFEX beams. A full size (10 cm×10 cm×2 mm) LBO crystal was manufactured completely and is ready to install for the full-scale LFEX operation.

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