Claims

1. A system comprising:

   a laser source configured to generate a laser beam;

   a nonlinear crystal

      positioned such that a focus of the laser beam is outside the nonlinear crystal in at least one

      plane perpendicular to a beam propagation direction of the laser beam, wherein the laser beam is converted from a first wavelength to a second wavelength by the nonlinear crystal; and

   a crystal mount assembly, wherein the nonlinear crystal is disposed on the crystal mount

      assembly, wherein the crystal mount assembly includes a plurality of mounting features at different distances from the laser source in the beam propagation direction, wherein each of the mounting features includes a hole that the crystal mount assembly is fastened into, wherein a beam size of the laser beam in the nonlinear crystal is provided by selecting one of the mounting features, and wherein the crystal mount assembly provides an angle stability of greater than 0% and less than or equal to 27% of an angular acceptance range during operation.

2. The system of claim 1, further comprising beam shaping optics disposed between the laser source and the nonlinear crystal and disposed downstream of the nonlinear crystal in the beam propagation direction.

3. The system of claim 1, wherein the crystal mount assembly is configured to adjust a beam size of the laser beam in the nonlinear crystal by adjusting a distance between a center of the nonlinear crystal and the focus.

4. The system of claim 1, wherein the nonlinear crystal is positioned such that the focus of the laser beam is outside the nonlinear crystal in the at least one plane perpendicular to the beam propagation direction of the laser beam with a Rayleigh range configured such that time averaged fundamental optical power density or harmonic optical power density at the spatial peak of the beam profile on or in at least one optical component in the system is limited to below 1 MW/cm^2.

5. The system of claim 1, wherein the laser beam is a pulsed laser beam, and wherein the nonlinear crystal is positioned such that the focus of the pulsed laser beam is outside the nonlinear crystal in the at least one plane perpendicular to the beam propagation direction of the pulsed laser beam with a Rayleigh range configured such that fundamental optical fluence power density or harmonic optical fluence on or in at least one optical component of the system is limited to below 10 J/cm^2.

6. The system of claim 1, wherein the crystal mount assembly is adjustable, and wherein the nonlinear crystal is positioned such that the focus of the laser beam is outside the nonlinear crystal in the at least one plane perpendicular to the beam propagation direction of the laser beam with a Rayleigh range configured such that time-averaged fundamental optical power

density or harmonic optical power density at the spatial peak of the beam profile on or in at least one optical component in the system is limited to below 1 MW/cm^2.

7. The system of claim 1, wherein the laser beam is a pulsed laser beam, wherein the crystal mount assembly is adjustable, and wherein the nonlinear crystal is positioned such that the focus of a pulsed laser beam is outside the nonlinear crystal in the at least one plane perpendicular to the beam propagation direction of the pulsed laser beam with a Rayleigh range configured such that fundamental optical fluence or harmonic optical fluence on or in at least one optical component in the system is limited to below 10 J/cm^2.

8. The system of claim 1, wherein the focus is at least one of circular, elliptical, or astigmatic.

9. The system of claim 1, wherein the focus is elliptical, and wherein the focus in a plane parallel to a walk-off is larger than the focus in a plane perpendicular to the walk-off.

10. The system of claim 1, wherein the focus is astigmatic, and wherein the focus in one plane is inside the nonlinear crystal and the focus in another plane is outside the nonlinear crystal.

11. The system of claim 1, wherein the focus is astigmatic and elliptical, wherein the focus in one plane is inside the nonlinear crystal and the focus in another plane is outside the nonlinear crystal, and wherein the focus inside the nonlinear crystal has a larger width than the focus outside the nonlinear crystal.

12. The system of claim 1, wherein the system is configured such that the wavelength conversion is one of second harmonic generation, sum-frequency generation, or difference frequency generation.

13. The system of claim 1, wherein the crystal mount assembly is screwed into one of the mounting features.