

Broadband Frequency Tripling Based on Segmented Partially-Deuterated KDP Crystals

Feng Bin¹, Han Wei, Li Fuquan, Li Keyu and Wang Fang

Research Center of Laser Fusion, China Academy of Engineering Physics,
P. O. Box 919-988#, Mianyang, Sichuan 621900, China.

We report a novel frequency tripler for efficient conversion of broadband high power laser pulses at 1 μm . The tripler is composed of several segmented partially deuterated KDP with discrete values of deuteration. Deuteration level can be used as a degree of freedom to alter the phase-matching wavelength of a partially deuterated KDP crystal. The segmented partially deuterated KDP crystal is made by thermal bonding method. It has been shown that this new tripler is capable of enhancing the acceptance bandwidth of frequency tripling. A five-segment design is presented, which is applicable to the efficient frequency tripling of chirped pulses with a bandwidth of $\sim 4\text{-nm}$, and hence suitable for Nd:glass petawatt laser system.

¹ E-mail: fengbin2000@live.cn