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Title:P-polarized Cherenkov THz wave radiation generated by optical rectification for a Brewster-cut LiNbO₃ crystal

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Abstract: In this paper, we investigated p-polarized Cherenkov radiation excited by an ultra-short laser pulse focused into a line in an LiNbO₃ crystal. The geometries of p- and s-polarized THz generation were both analyzed. We did further calculations on p-polarized THz radiation and designed a Brewster-cut geometry. The radiated energy and conversion efficiency were roughly estimated. Compared with s-polarized waves radiated from a Cherenkov-cut crystal, p-polarized THz radiation has lower energy and conversion efficiency, but higher intensity and better beam quality. The effect of angular dispersion between the spectral components of the THz pulse after refraction at the Brewster surface was also discussed.

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