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Nonlinear Cerenkov radiation in a two-dimensional nonlinear photonic crystal waveguide. S.N. ZHU, Y. ZHANG, Z. YAN, Z. QI, G. ZHAO, National Laboratory of Solid State Microstructures, Nanjing University — We present a new type of quasi-phase-matched Cerenkov radiation generation from a two- dimensional nonlinear photonic crystal waveguide: a hexagonally poled LiTaO3 waveguide. The waveguide was fabricated by field poling followed by proton exchange technique. The fundamental source was a LD-pumped, 90-ns pulsed Q-switch double wavelength Nd:YAG laser at 1064-μm and 1319-μm. The pulse repetition rates was 8-kHz. When the fundamental beams at 1064-μm and 1319-μm were collinearly focused into the waveguide and propagated along its x-axis, multiple radiation spots at red, yellow, green with different propagation directions and radiation angles are simultaneously exhibited from such a hexagonally poled waveguide. Scattering involved erenkov arc is also observed. These frequency conversion processes were realized by guided-to-radiated mode interaction. Phase-matching for these processes in the waveguide was automatically achieved by a quasi-phase-matched Cerenkov configuration.

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