

Robust, high brightness, degenerate entangled photon source at room temperature

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We report on a compact, simple and robust high brightness entangled photon source at room temperature. Based on a 30 mm long periodically poled potassium titanyl phosphate (PPKTP), the source produces non-collinear, type-0 phase-matched, degenerate photons at 810 nm with pair production rate as high 39.13 ± 0.04 MHz/mW at room temperature. To the best of our knowledge, this is the highest photon pair rate generated using bulk crystals pump with a continuous-wave laser. Combined with the inherently stable polarization Sagnac interferometer, the source produces entangled state violating the Bell's inequality by nearly 10 standard deviations and a Bell-state fidelity of 0.96. The compact footprint, simple and robust experimental design and room temperature operation, make our source ideal for various quantum communication experiments including long distance free space and satellite communications.