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Four-wave mixing in optical fibers has been proven to have many applications within processing of classical optical signals. In addition, recent developments in multimode fibers have made it possible to achieve the necessary phase-matching for efficient four-wave mixing over a very wide bandwidth. Thus, the combination of multimode fiber optics and four-wave mixing is very attractive for various applications. This is especially the case for applications in quantum communication, for example in photon-pair generation. This is the subject of this work, where we discuss the impact of fluctuations in core radius on the quality of the heralded single-photon states and demonstrate experimental results of intermodal spontaneous four-wave mixing for photon-pair generation.

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