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Scalable generation of multiple quantum correlated beams from hot rubidium vapors JIETAI JING, ZHONGZHONG QIN, HAILONG WANG, JIA KONG, LEIMING CAO, WEIPING ZHANG, East China Normal University — Quantum correlation and quantum entanglement shared among multiple quantum nodes are the fundamental ingredients for the future quantum internet. In order to make an efficient quantum interface between multi-mode quantum light sources and the atomic ensemble which has been proven to be a good candidate for quantum memory and quantum repeater, it is necessary to generate the multimode quantum light sources which match the atomic transition lines of the atomic ensemble. Here we present a scalable method for generating the multiple quantum correlated beams by using multiple four wave mixing processes in hot Rubidium vapor and we experimentally showed that the strong quantum correlation among the three bright beams. Their relative intensity difference is -5.6dB below the correspondent shot noise limit and the squeezing from only one vapor cell in such system is -3.5dB. This result agrees with our theoretical prediction that the quantum correlation in our scheme increases as the number of quantum modes increases. Our method also has the advantages of scalability and potential applications in producing multipartite quantum entangled images.

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