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**Generation of nondegenerate narrow-band photon pairs for hybrid quantum network** JIAN WANG, PENGYINJIE LV, JINMING CUI, BI-HENG LIU, JIANSHUN TANG, YUNFENG HUANG, CHUANFENG LI, GUANGCAN GUO, Univ of Sci Tech of China — In a hybrid quantum network, the linking two types of quantum nodes through photonic channels requires excellent matching of the central frequency and bandwidth between both nodes and their interfacing photons. However, pre-existing photon sources cannot fulfill this requirement. Using a novel conjoined double-cavity strategy, we report the generation of nondegenerate narrow-band photon pairs by cavity-enhanced spontaneous parametric down-conversion. The central frequencies and bandwidths of the signal and idler photons are independently set to match with trapped ions and solid-state quantum memories. With this source we achieve the bandwidths and central frequencies of 4 MHz at 935 nm and 5 MHz at 880 nm for the signal and idler photons, respectively, with a normalized spectral brightness of 4.9/s/MHz/mW. Due to its ability to be independently locked to two different wavelengths, the conjoined double-cavity is universally suitable for a hybrid quantum network consisting of various quantum nodes.

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