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The Road to DLCZ Protocol in Rubidium Ensemble CHANG LI, YUNFEI PU, NAN JIANG, WEI CHANG, SHENG ZHANG, Tsinghua Univ, CENTER FOR QUANTUM INFORMATION, INSTITUTE FOR INTERDISCIPLINARY INFORMATION SCIENCES, TSINGHUA UNIV TEAM — Quantum communication is the powerful approach achieving a fully secure information transferal. The DLCZ protocol ensures that photon linearly decays with transferring distance increasing, which improves the success potential and shortens the time to build up an entangled channel. Apart from that, it provides an advanced idea that building up a quantum internet based on different nodes connected to different sites and themselves. In our laboratory, three sets of laser-cooled Rubidium 87 ensemble have been built. Two of them serve as the single photon emitter, which generate the entanglement between ensemble and photon. What's more, crossed AODs are equipped to multiplex and demultiplex optical circuit so that ensemble is divided into 2 hundred of 2D sub-memory cells. And the third ensemble is used as quantum telecommunication, which converts 780nm photon into telecom-wavelength one. And we have been building double-MOT system, which provides more atoms in ensemble and larger optical density.

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