

Bound entangled states with nonzero distillable key rate

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We present sufficient conditions for quantum states to have positive distillable key rate. Exploiting the conditions, we show that the bound entangled states given by Horodecki *et al.* [Phys. Rev. Lett. **94**, 160502 (2005), quant-ph/0506203] have nonzero distillable key rate, and finally exhibit new classes of bound entangled states with positive distillable key rate, but with negative Devetak-Winter lower bound of distillable key rate for the ccq states of their privacy squeezed versions.

Presented by Taewan Kim