

**Alice**

$(4)$  Alice  $\mathbf{y}_A$

$(9)$  LDPC 2 BP  
decoder

Alice  $\hat{\mathbf{y}}_B^{(10)}$

$(8)$  LDPC 1  
decoder

$(7)$  Classical  
channel

$(3)$  Equivalent  
channel

**Bob**

$(1)$  QRNG

$(2)$  Bob  $\mathbf{y}_B$

$(5)$  Syndrome side  
information  $\mathbf{s}_B$

$(6)$  LDPC 1  
encoder