

$$\sum_{k=0}^{2^n-1} \left(a_{k0} |k\rangle \otimes \frac{1}{2} (|0\rangle + |1\rangle) \otimes (|00\rangle + |11\rangle) \right. \\ \left. + a_{k1} |j\rangle \otimes \frac{1}{2} (|0\rangle - |1\rangle) \otimes (|10\rangle + |01\rangle) \right).$$