

1. encode  $k$  qubit in  $[n, 10k, d]$  good qLDPC code. With a reducing Lemma for threshold  $l$ .
2. implement  $X, Z, H, T$  in the straightforward way.
3. The  $CX$ , need more attention. Denote by  $g_i$  a generator of  $C$  and notice that we took only  $1/10$ -fraction of the generator in the encoding process. Now, any  $CX$  will be followed by correction step. The idea we stretch a wire according predetermined match between the qubits in the support of  $g_i$  and the qubits in the support of  $g_j$ .
4. As we took only a fraction of the code space, we can require that any codeword spanned by the  $g_j$ 's has an overlap with  $g_i$  which less than  $l/3$ . Or in other words, the decoder can correct a non desire  $CX$  in single step  $\sim$ .
5. key point of the bullet above is that by overlap we mean to the bitwise AND, otherwise, saying that we have such  $C$  is equivalence to say that we found a code with positive rate and distance greater than  $\frac{1}{2}$ . What we are actually want is that any code word will has a small weight, and there fore can't inferred as other codeword when we apply the  $CX$  gate.