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FABLE: Fast Approximate BLock Encodings

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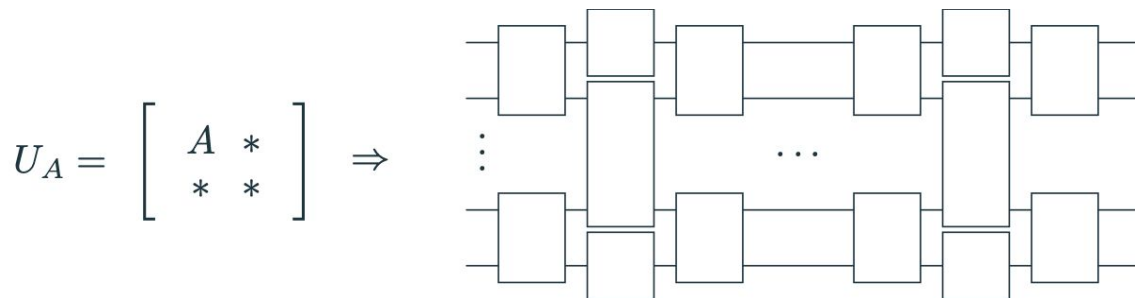
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FABLE

Fast Approximate BLock Encodings

- Many QNLA algorithms rely on **QSVT**
- Implementation ultimately depends on a **block encoding** circuit



See also: [talk by Chao Yang on Thursday](#)

Come check out the poster for more details and feel free to ask questions there or reach out at dcamps@lbl.gov !

FABLE...

- solves this problem in a user-friendly way using **QCLAB**

```
1 [circuit, ~, alpha] = fable( A ) ;  
2 U = circuit.matrix ;  
3 A_BE = 2^n * U(1:2^n, 1:2^n) ;  
4 norm(A - alpha*A_BE)
```

```
ans =  
2.7439e-15
```

- **exact encoding** generically requires $O(N^2)$ single- and two-qubit gates
 - quantum representation of dense matrices
- **compressed** circuits for **approximate** block encodings
 - reduced gate complexity