



## سمینار هفتگی گروه اطلاعات کوانتومی

سه‌شنبه ۱۳۹۳/۹/۴، ساعت ۱۵:۰۰، اتاق شورا

# Bypassing no-go theorems on transformations of unknown quantum operations

Mehdi Soleimanifar

Physics Department  
Sharif University of Technology

mehdi.soleimanifar@gmail.com

### Abstract

In classical computation, cloning of states, controlling or changing the order of unknown operations and modular structures are possible. In quantum computation, these seem to be impossible in general. Only recently the problem of transformations of unknown quantum operations has been noted in the literature, and no-go theorems similar to the no-cloning theorem have been discovered.

In the first part of this talk, I will address some of these limitations in the context of quantum circuits and then introduce the concept of "supermaps" as a method to investigate the problem. Applications of no-go theorems in commercial uses or secure computation will be reviewed as well. Finally, I will talk about bypassing these no-go theorems, and their physical implementation.

## References

- [1] Mateus Arajo, Adrien Feix, Fabio Costa and Caslav Brukner, "Quantum circuits cannot control unknown operations", arXiv:1309.7976
- [2] Jayne Thompson, Mile Gu, Kavan Modi, Vlatko Vedral, "Quantum Computing with black-box Subroutines", arXiv:1310.2927
- [3] G. Chiribella, G. M. D'Ariano, P. Perinotti, "Transforming quantum operations: quantum supermaps", arXiv:0804.0180