

# Introduction to some concepts in non-Hermitian systems

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In this course I aim at modeling and understanding some non-conservative physical systems. One might assume that the incorporation of a non-conservative element into a system would solely result in decay. Nevertheless, recent studies revealed that non-conservative systems can have markedly interesting features such as real spectrum, edge mode lasing, diverse topological properties, asymmetric switching, engineering photon blockade and more. That said, through using some simple models, participants will be introduced to the theoretical frontier of some rapidly expanding topics. The course does not require any specific knowledge or experience that the participant should possess. Feel free to contact me if you are interested!

## Plan of the course

- 1) Non-Hermitian Hamiltonian and exceptional points (3 hour lectures)
- 2) Importance of symmetries (4 hour lectures)
- 3) Non-Hermitian topology (complex Berry phase, edge mode and skin effect)(6 hour lectures)
- 4) An example of the non-Hermitian phase transition (6 hour lectures)
- 5) Photon blockade with exceptional points (6 hours)
- 6) An example of non-Hermitian physics in a magnetic system (5 hours)

**I invite interested students write me in advance. Thank you!**

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