



TOHOKU
UNIVERSITY



Topological band structures in AMO physics

Tomoki Ozawa

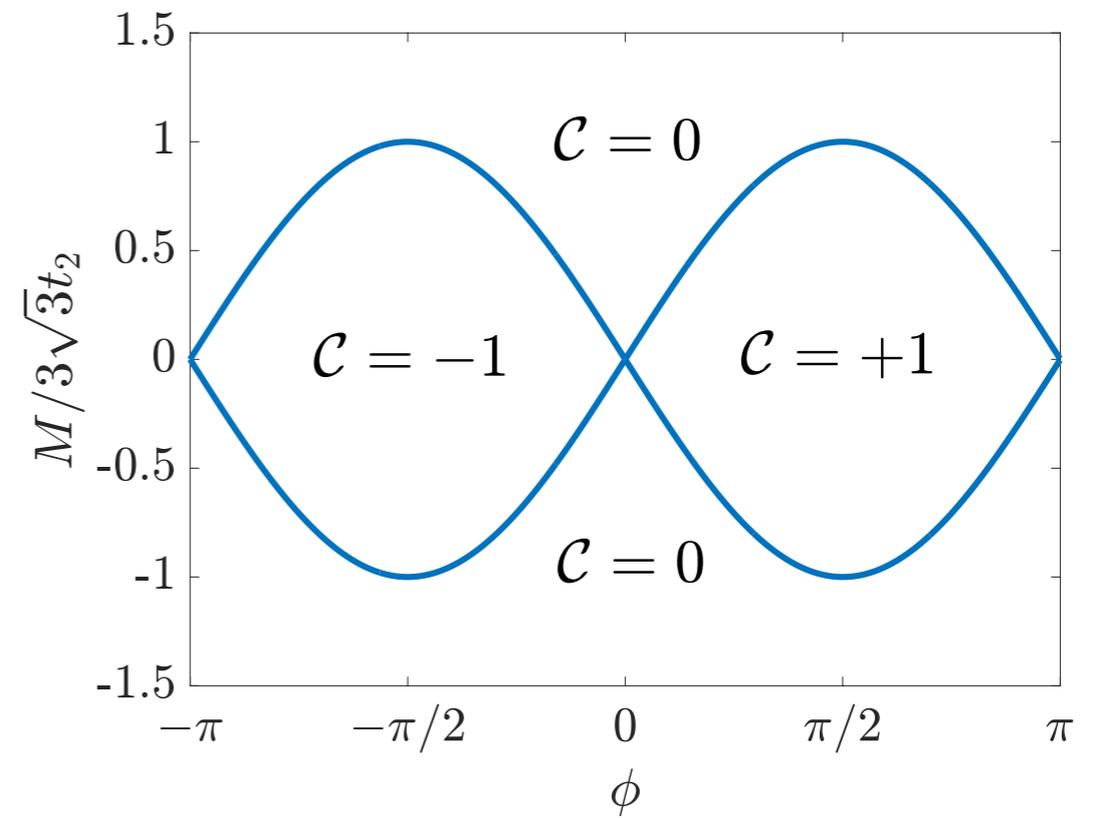
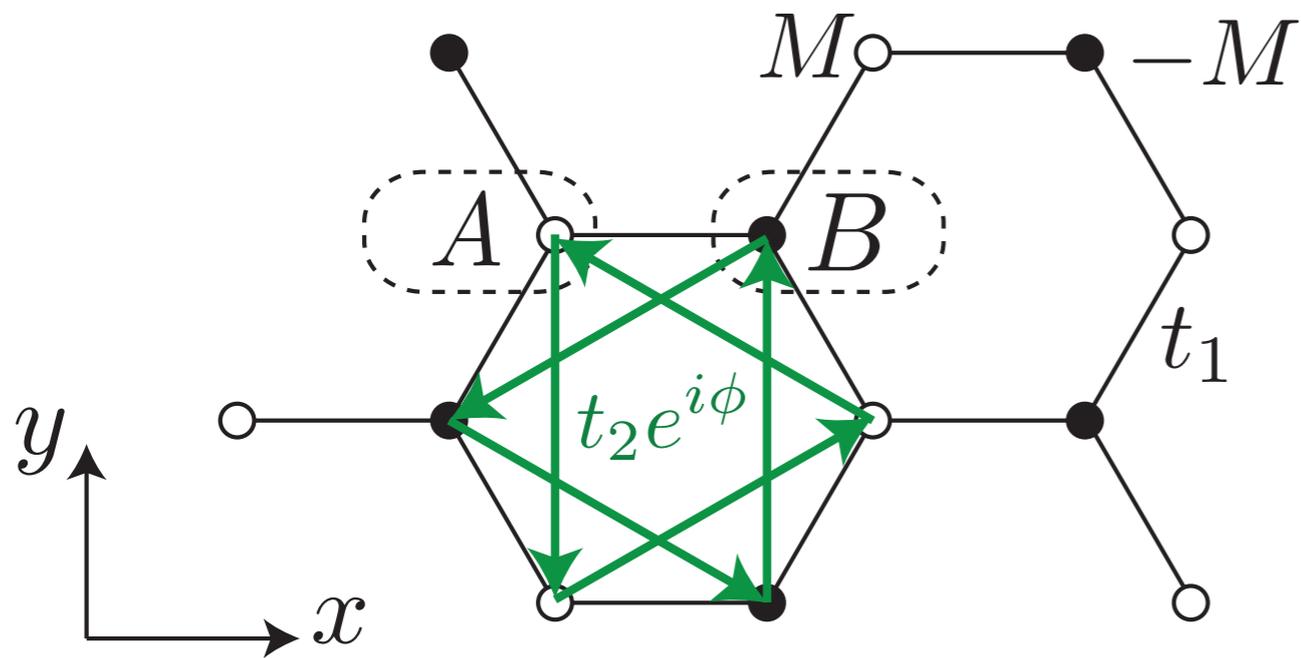
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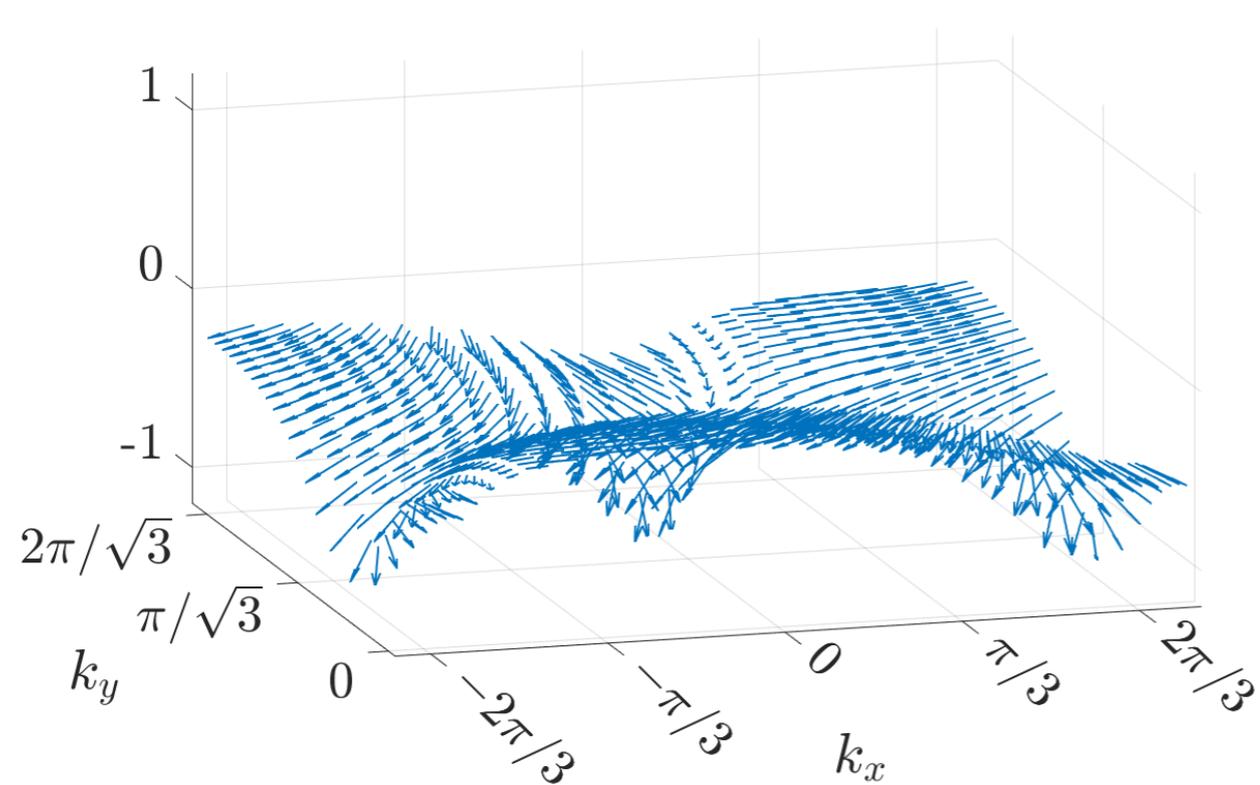
July 1 - 7, 2022

Haldane model



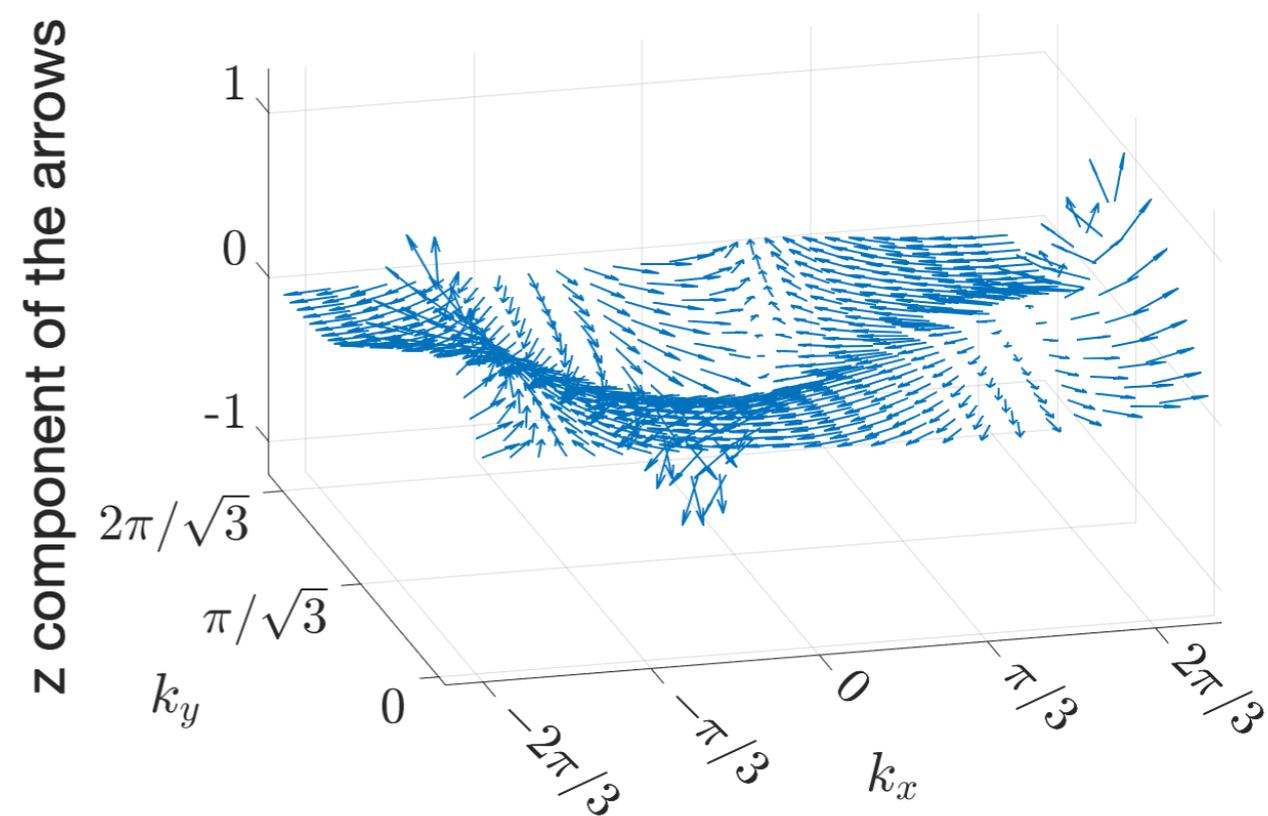
Haldane model: Bloch states

Trivial



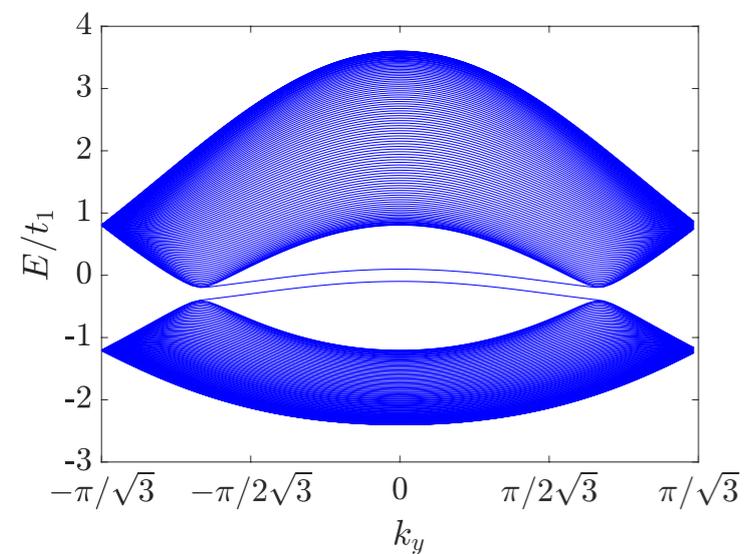
$$\phi = 0, M = t_2$$

Topological

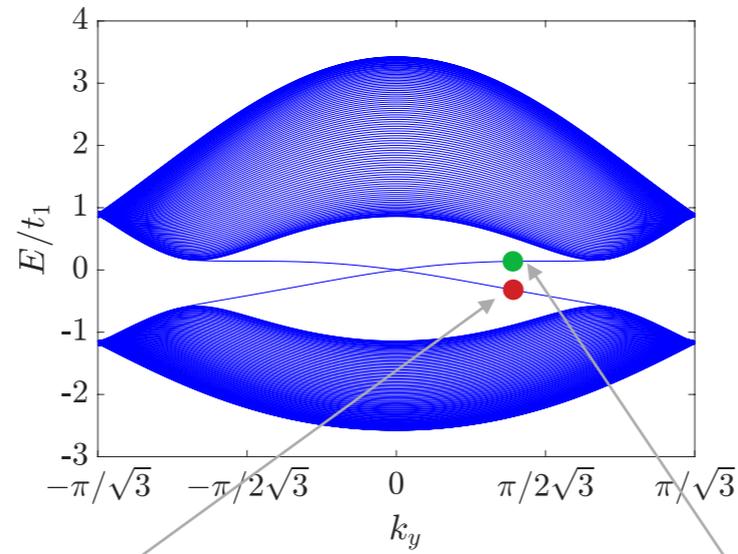


$$\phi = \pi/4, M = 0$$

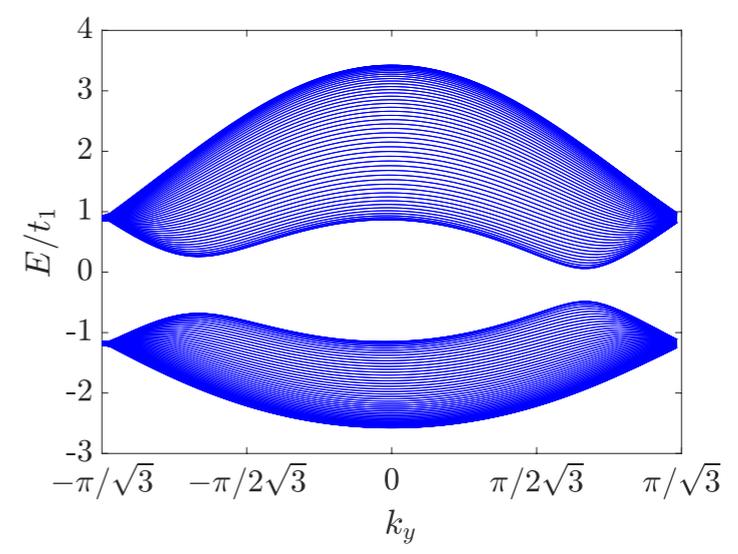
Haldane model: band structure and edge states



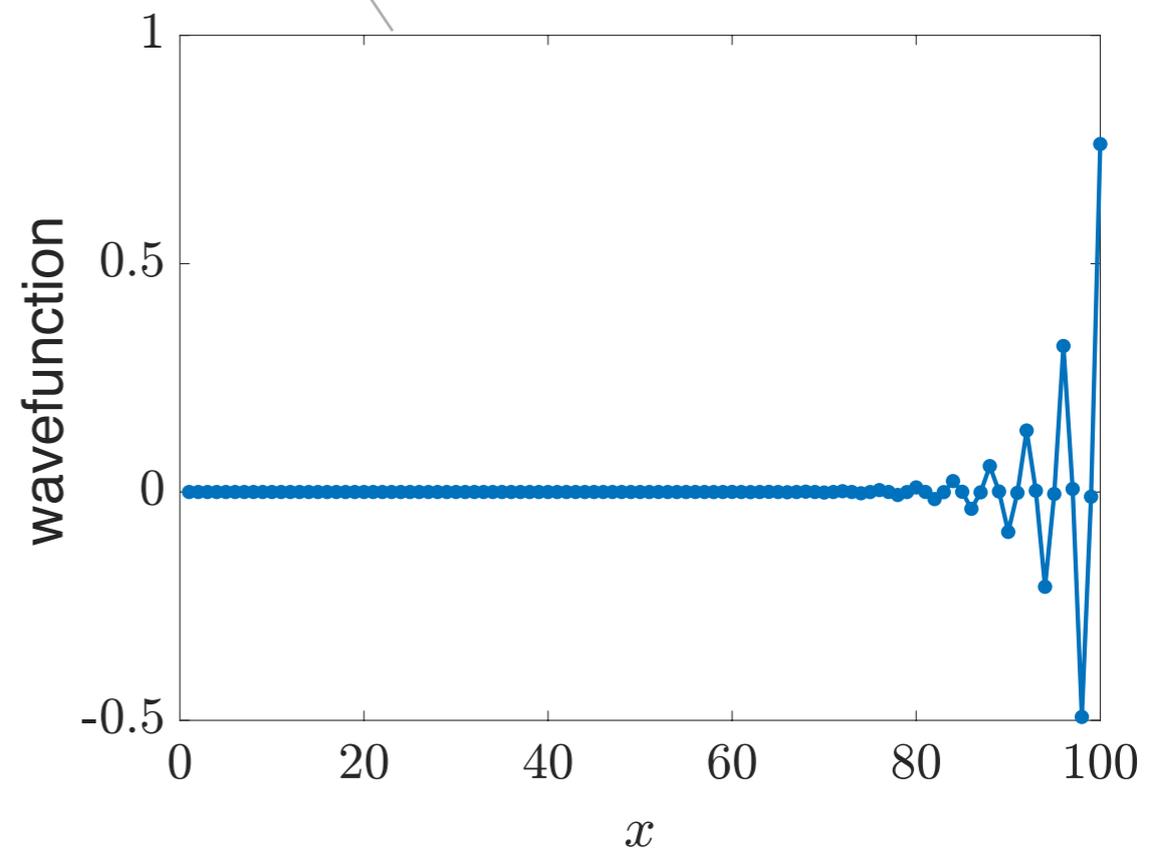
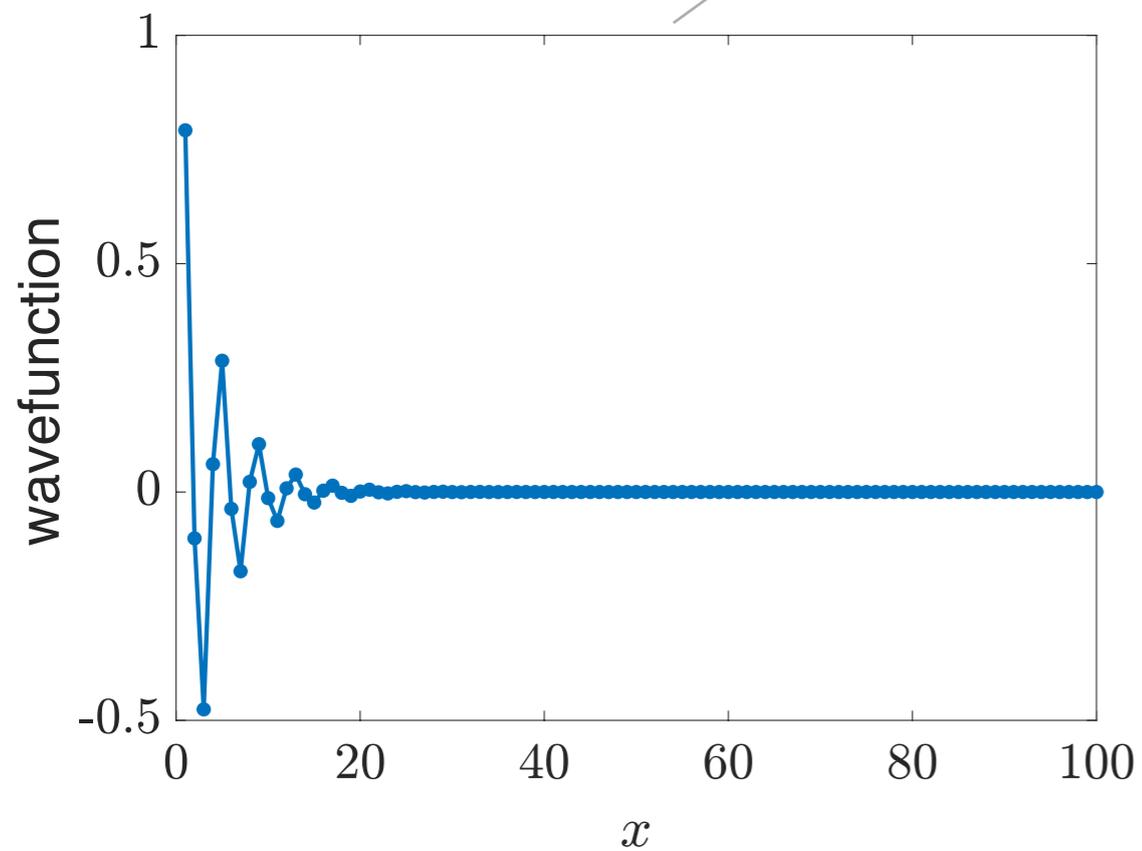
(a) $\phi = 0, M = t_2$



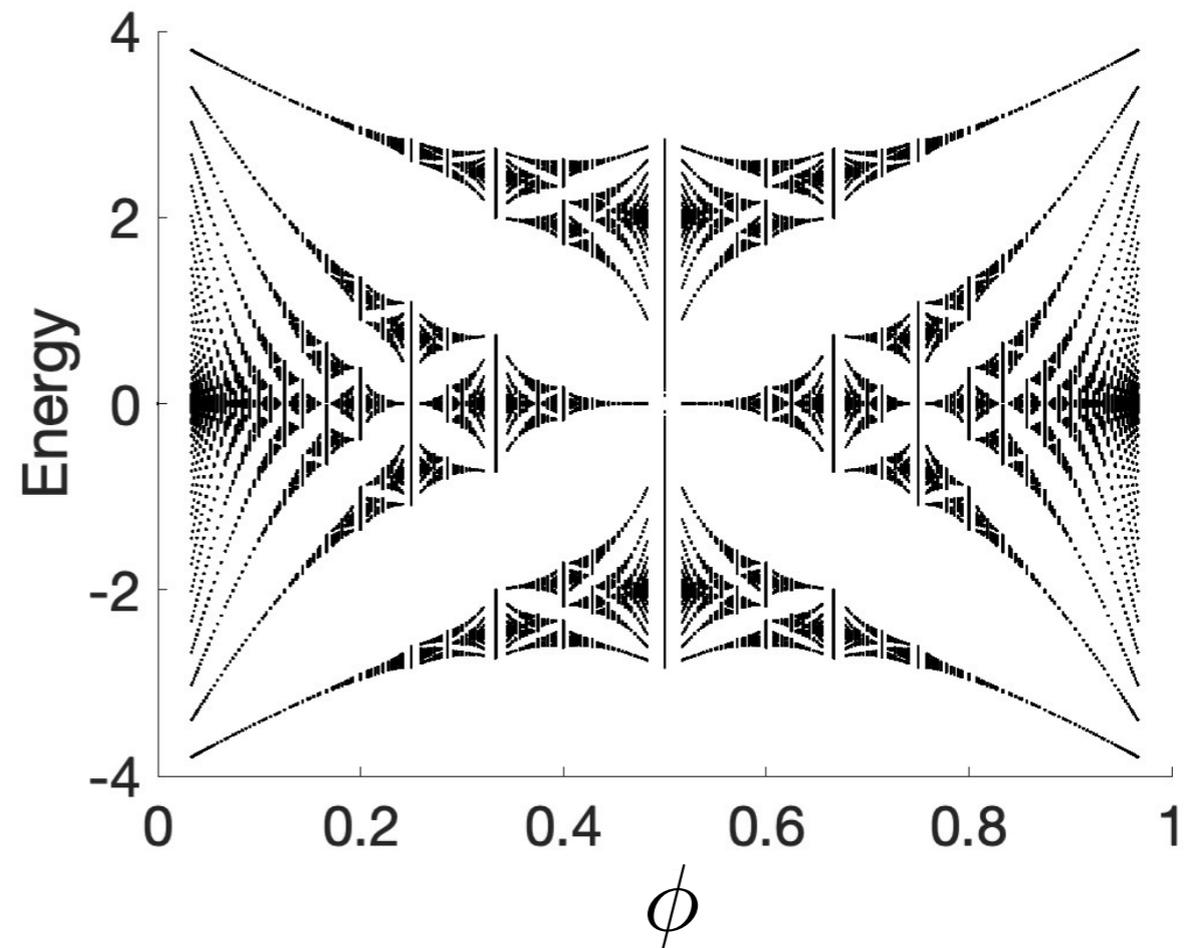
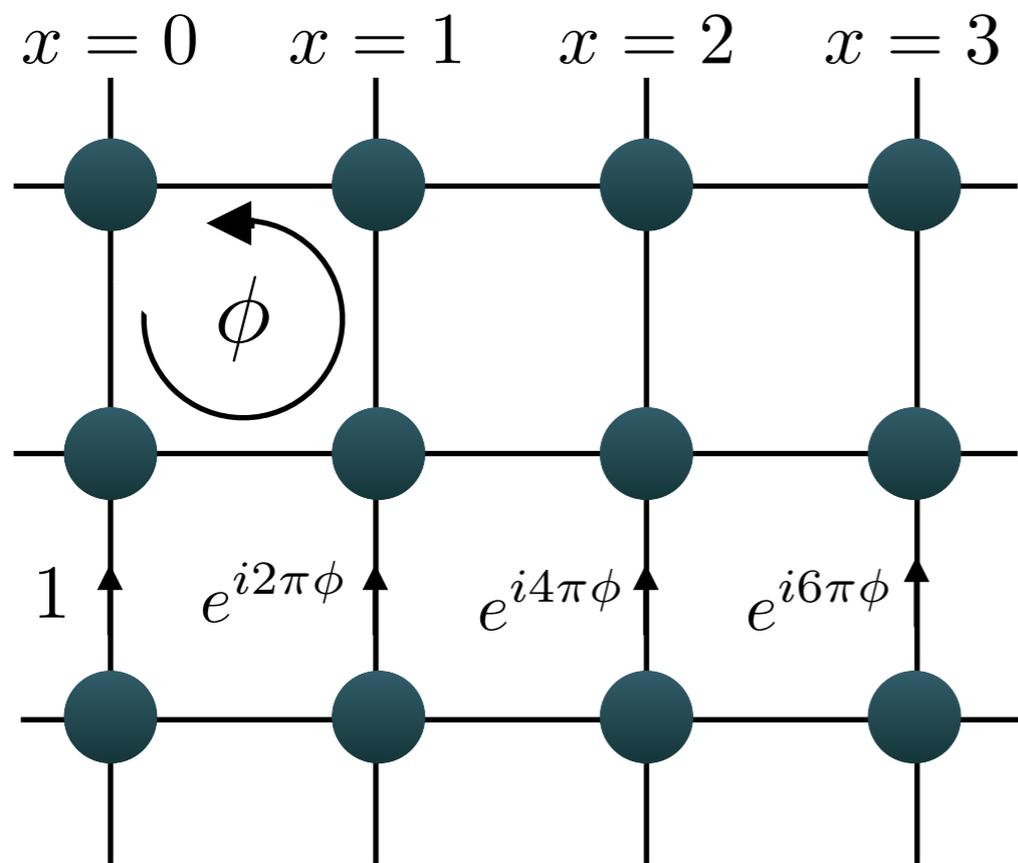
(b) $\phi = \pi/4, M = 0$



(c) $\phi = \pi/4, M = t_2$, Periodic boundary condition



Harper-Hofstadter model



Horizontal hopping is 1

Vertical hopping has x-dependent phase $e^{i2\pi\phi x}$

Harper-Hofstadter model: band structure

