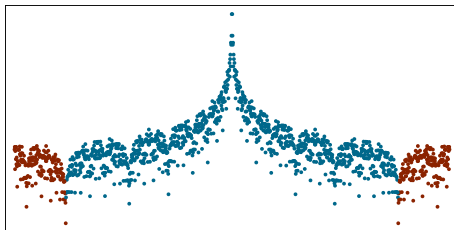# Gap structure of 1D cut and project Hamiltonians

Nicolas Macé, Anuradha Jagannathan, Frédéric Piéchon

Laboratoire de Physique des Solides
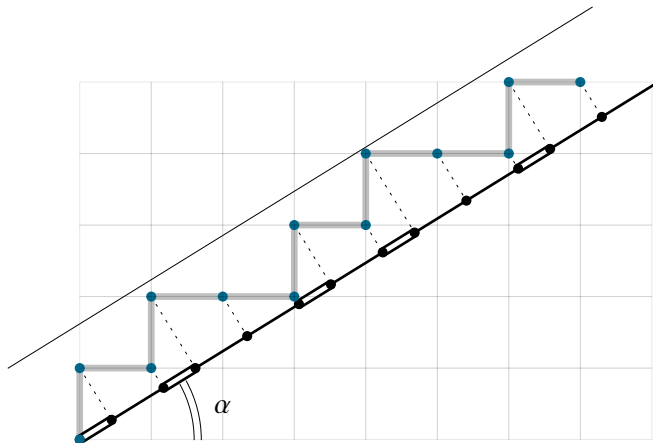Université Paris-Saclay

September 20, 2016

UNIVERSITÉ
PARIS
SUD

LPS
ORSAY

Outline

Electrons on quasiperiodic chains

$$\alpha_l = \frac{p_l}{q_l}$$

$$\alpha_l \to \alpha$$

Hamiltonian of the lth approximant:

$$H(\alpha) = \sum_{x \in \mathbf{Z}} t_{x,x+1} \ket{x} \bra{x+1} + \text{h.c.}$$

The gap labeling theorem

The IDOS inside spectral gaps can be indexed using the irrational involved in the construction of the chain

$$\mathrm{idos}(E \in \mathrm{gap}) = \frac{n}{1 + \alpha} \quad \mod 1$$