

Section 9 Constant Energy Surfaces & Density of States

Gerhard Klimeck

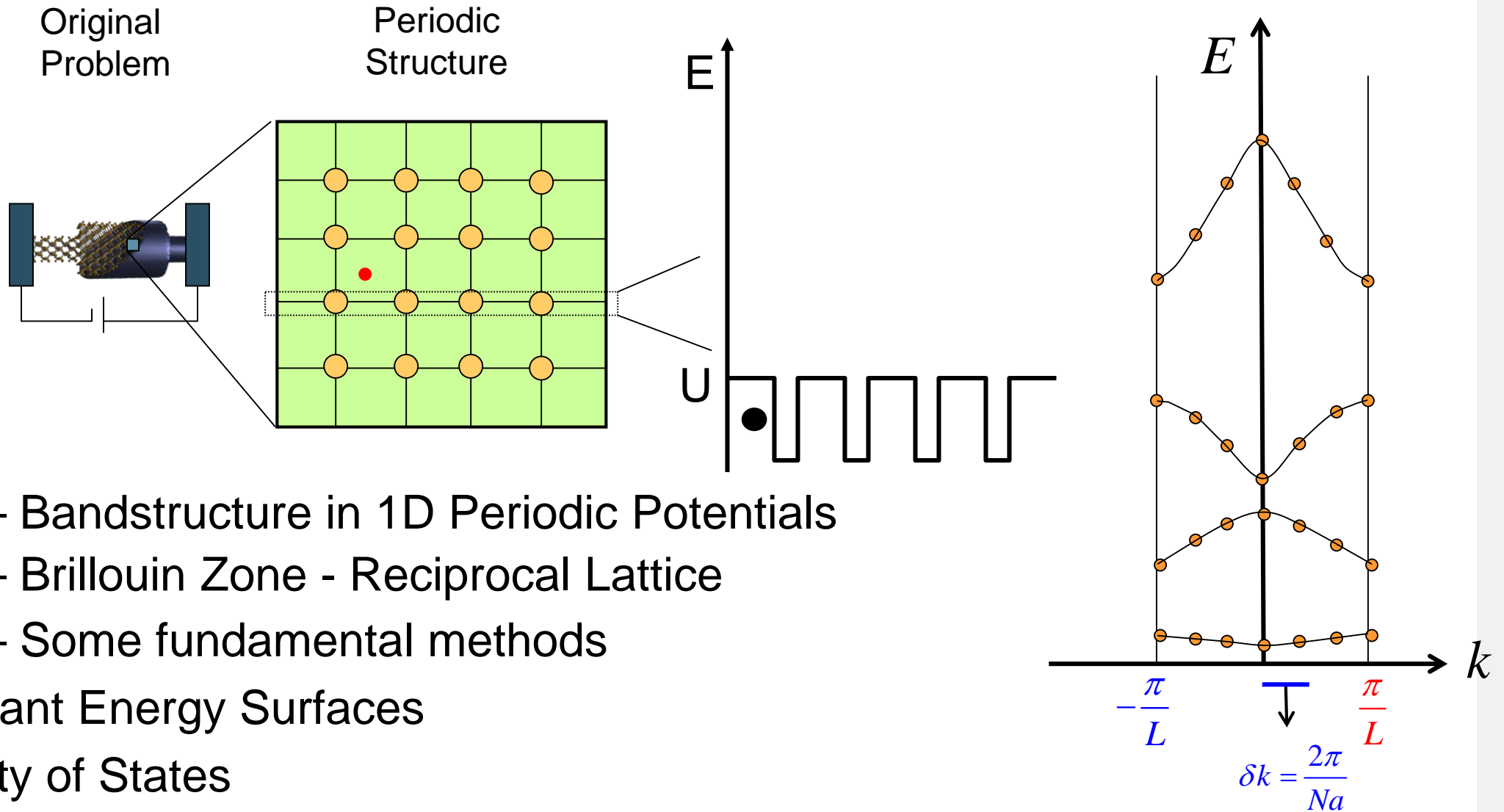
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School of Electrical and
Computer Engineering

Section 9

Constant Energy Surfaces & Density of States



Section 7 – Bandstructure in 1D Periodic Potentials

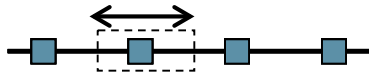
Section 8 – Brillouin Zone - Reciprocal Lattice

Section 9 – Some fundamental methods

- 9.1 Constant Energy Surfaces

- 9.2 Density of States

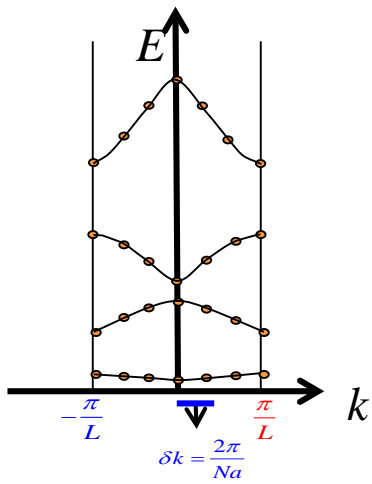
Brillouin Zone and Bandstructure for 1D Solids



Real-space

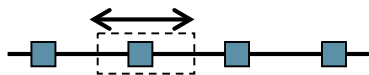


1st B-Z

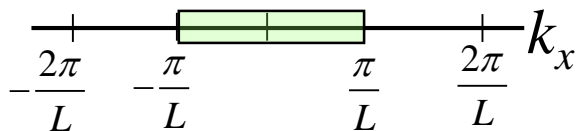
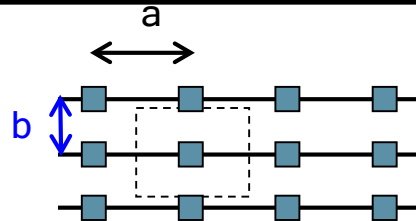


$E(k)$ diagram

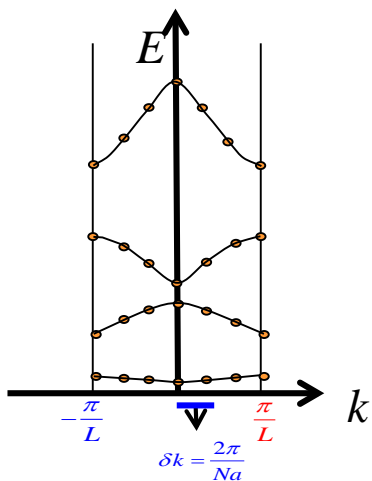
Brillouin Zone and Bandstructure for 2D Rectangular Lattice



Real-space

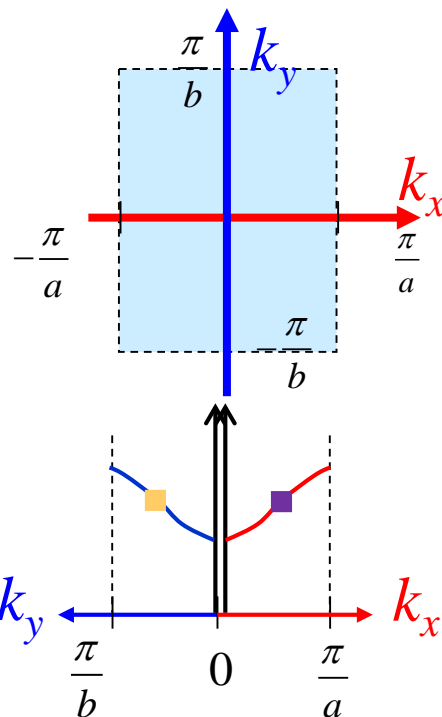


1st B-Z

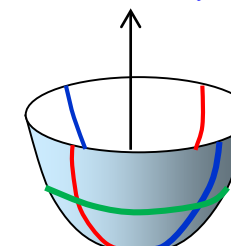


$E(k)$ diagram

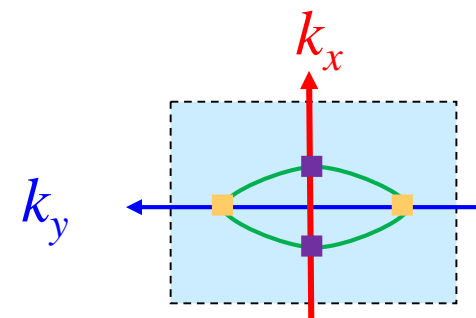
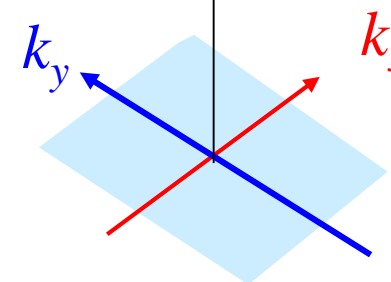
$E(k_x, k_y)$



$E(k_x, k_y)$



$E = \text{constant}$

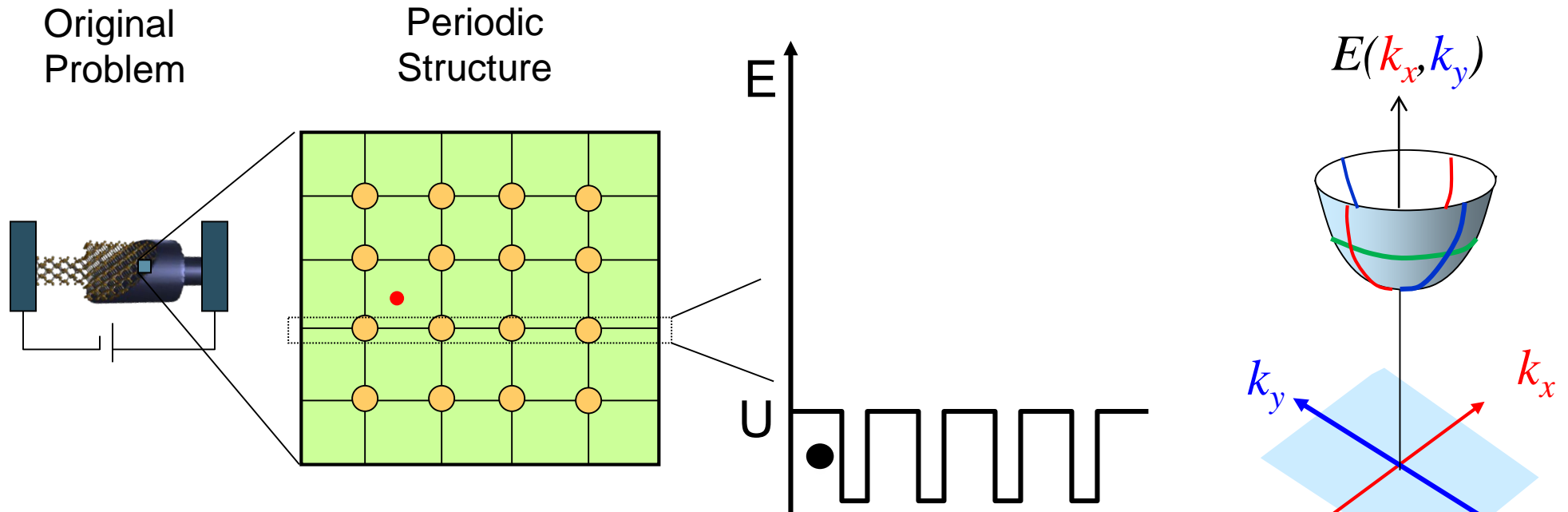


$E(k)$ lines in symmetry directions used all the time

Constant Energy Lines (2D) and Surfaces (3D) are used for Evaluating / Visualizing $E(\mathbf{k})$

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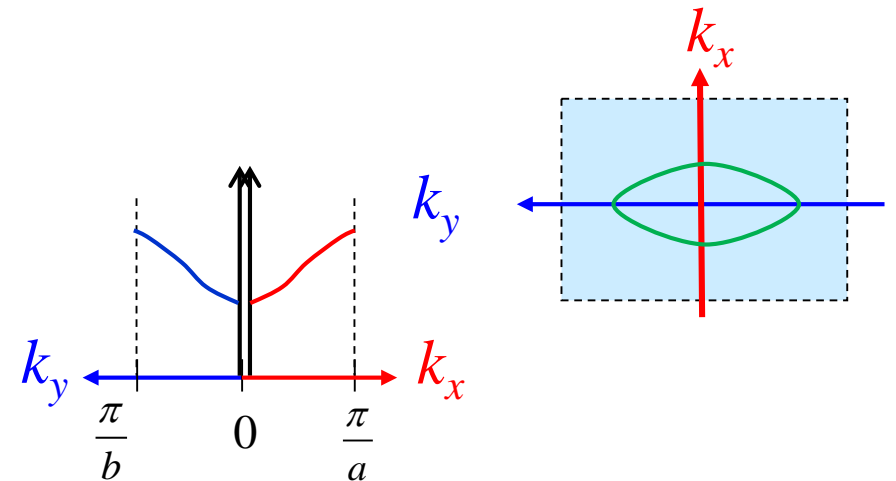
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• 9.1 Constant Energy Surfaces



• 9.2

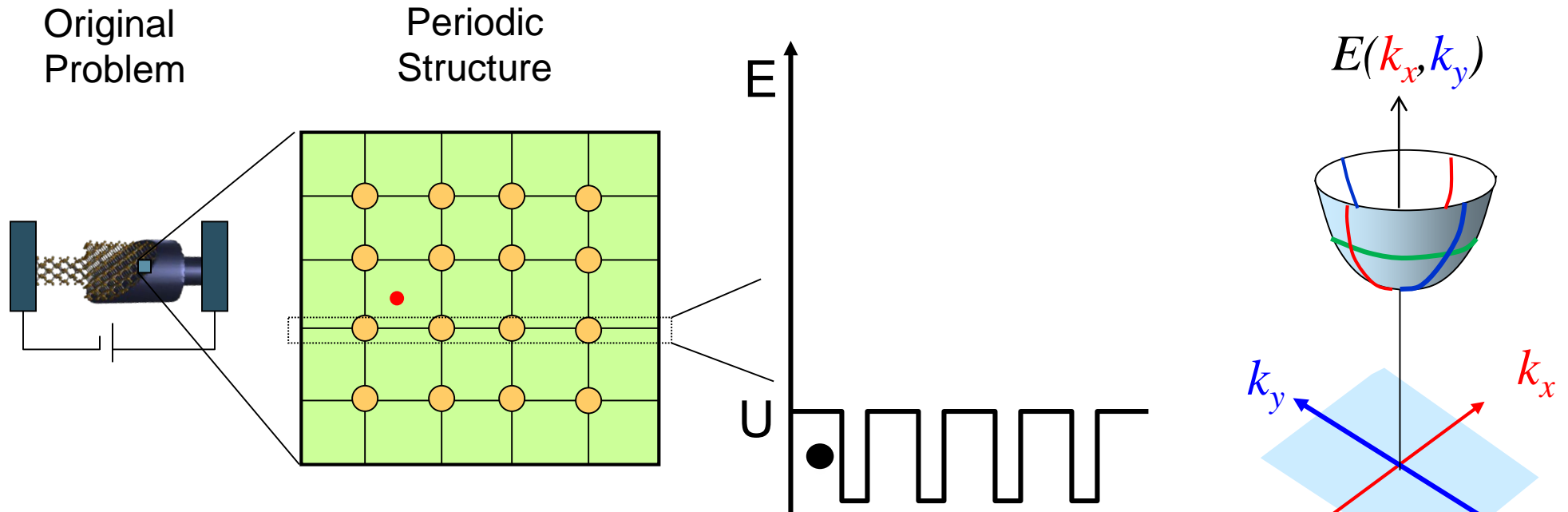


Video

Video

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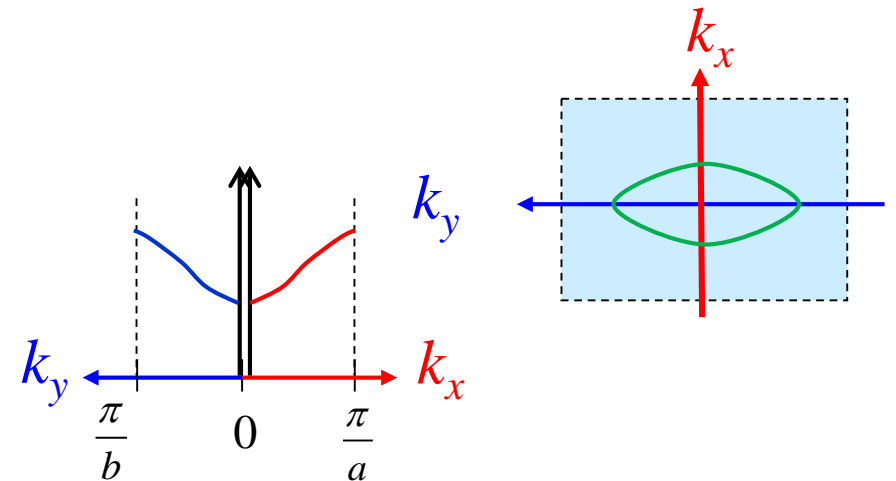
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Video

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