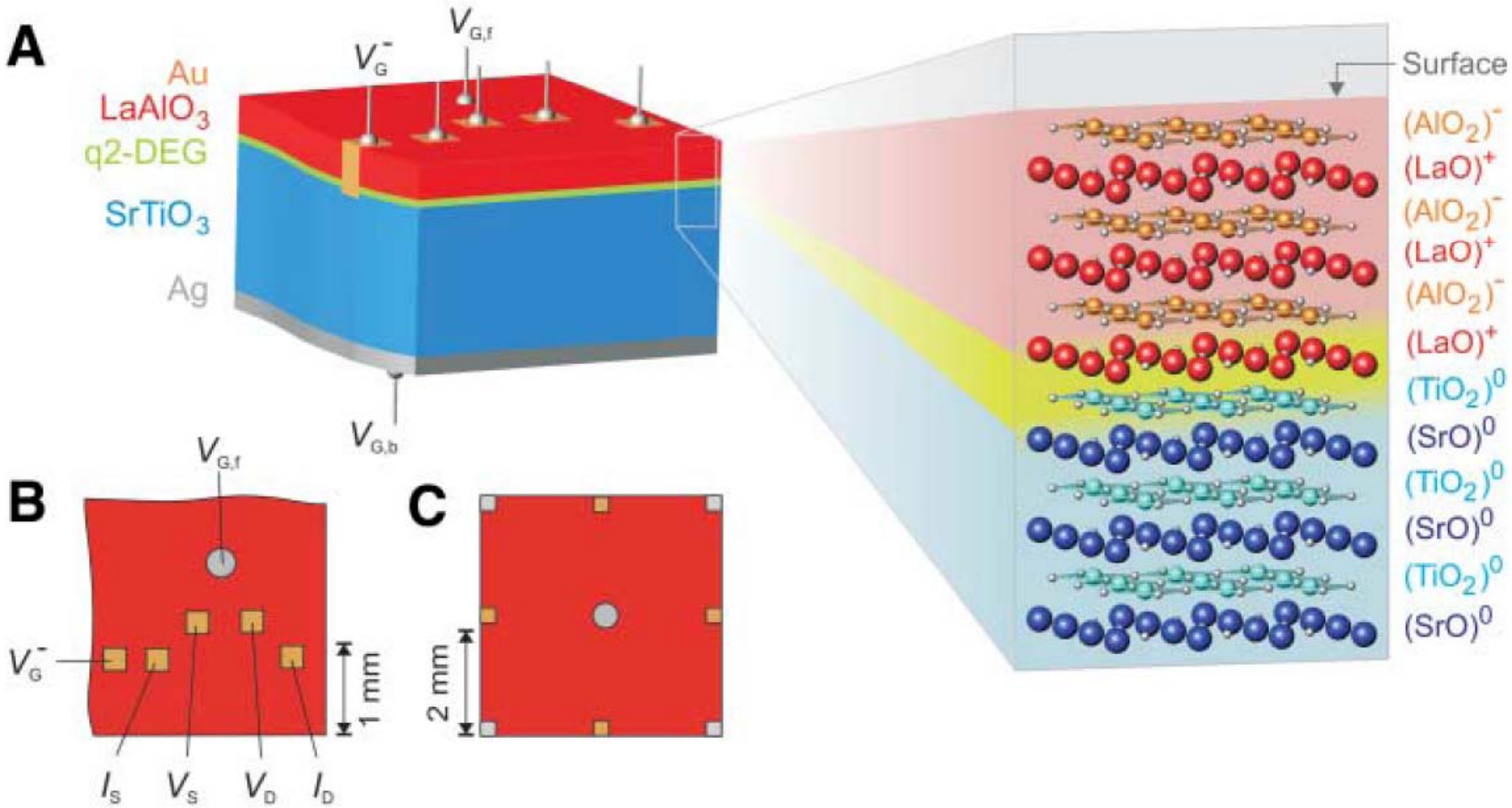
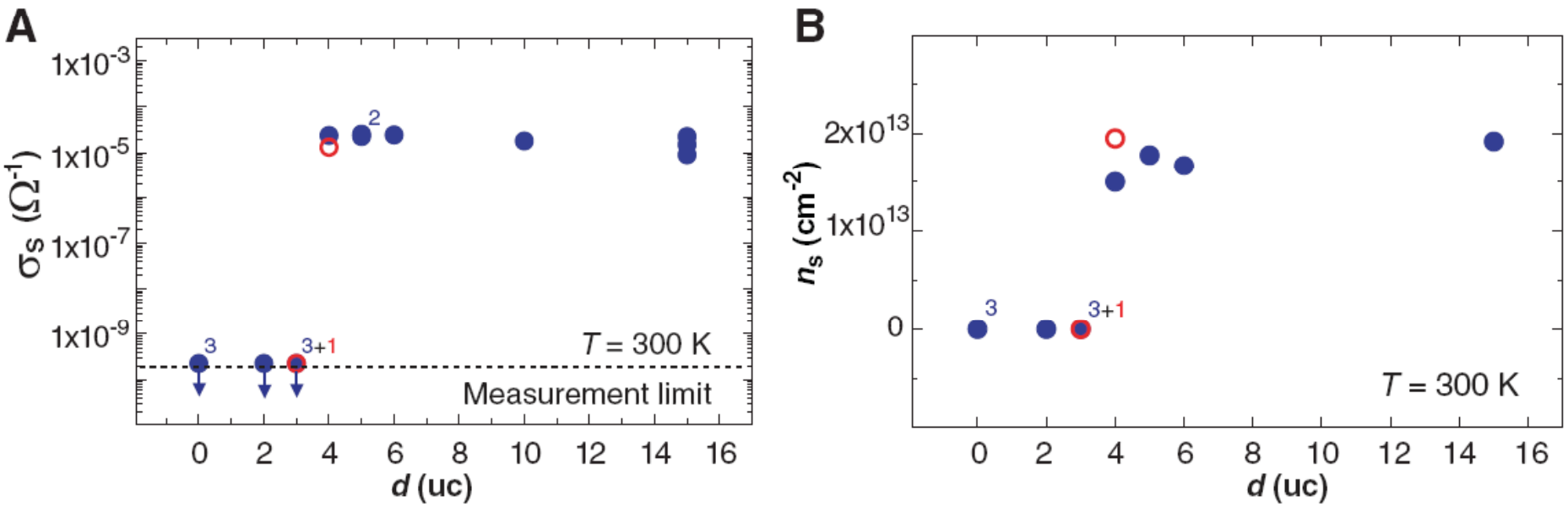
Making Use of Polar Surfaces

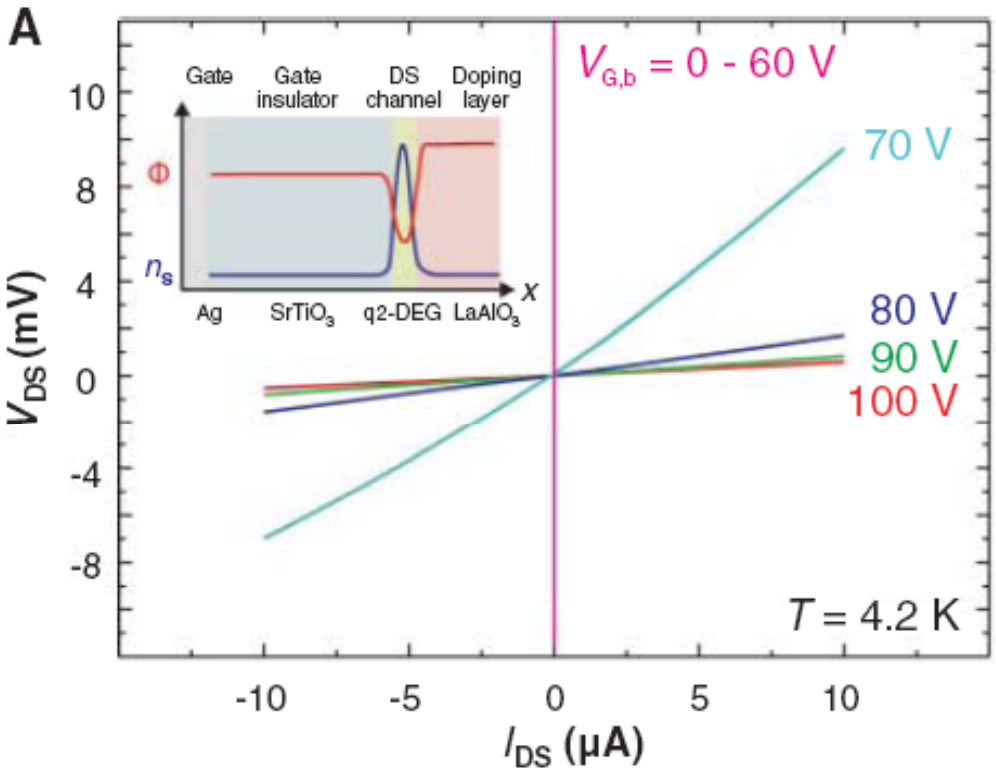


S. Thiel, G. Hammerl, A. Schmehl, C. W. Schneider, J. Mannhart, Science 313 (2006) 1942

Critical Thickness of 2D Electron Gas Formation



Field Driven Metal-Insulator Transition



Field Emission Microscope

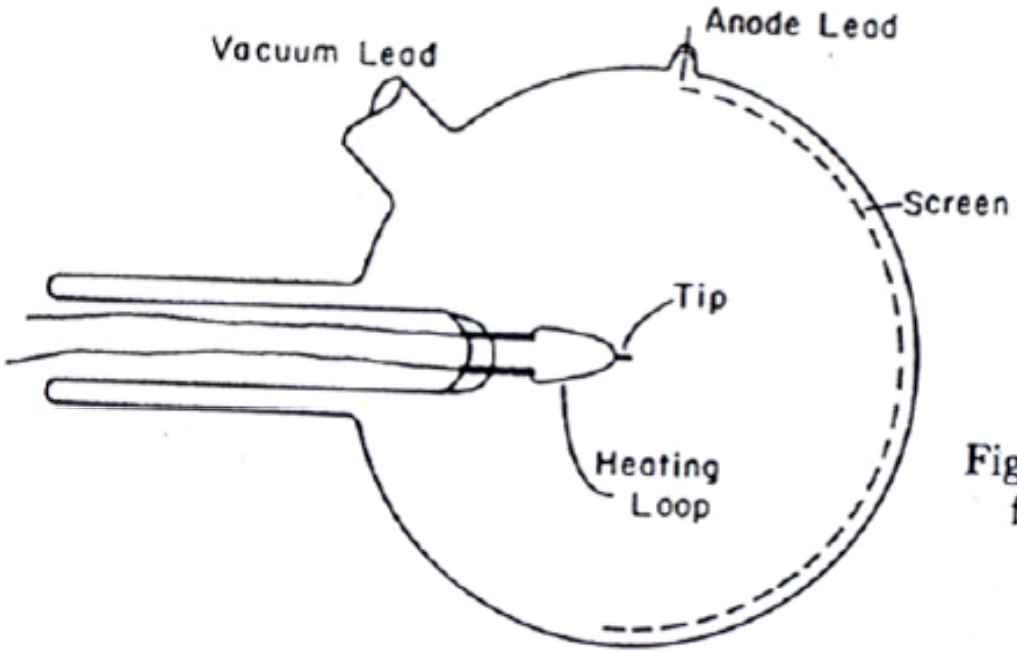
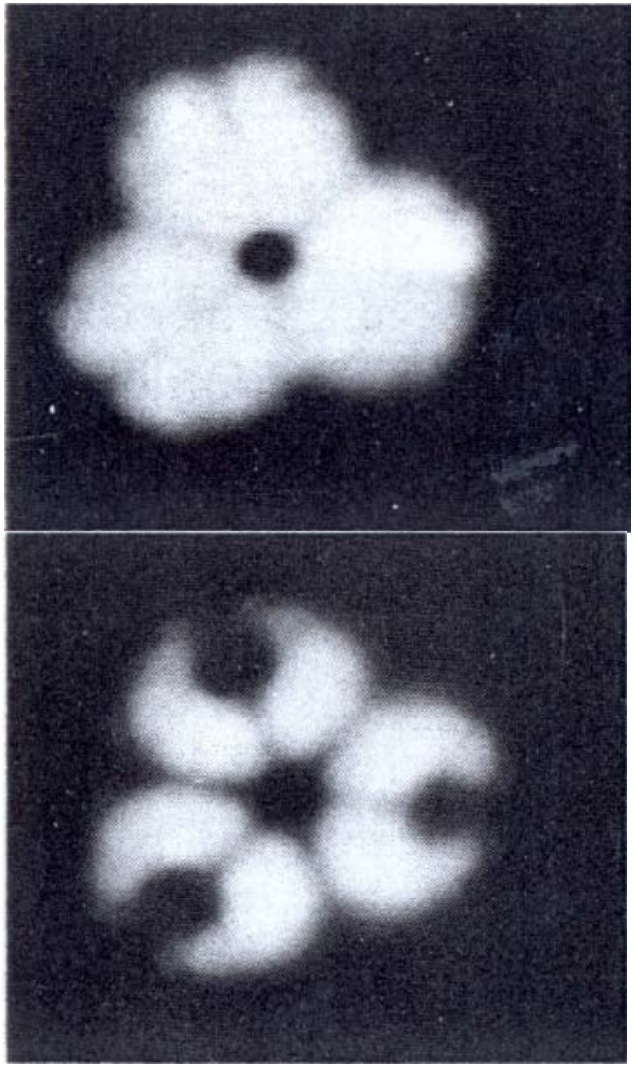


Fig. 14. Schematic diagram of field-emission microscope.

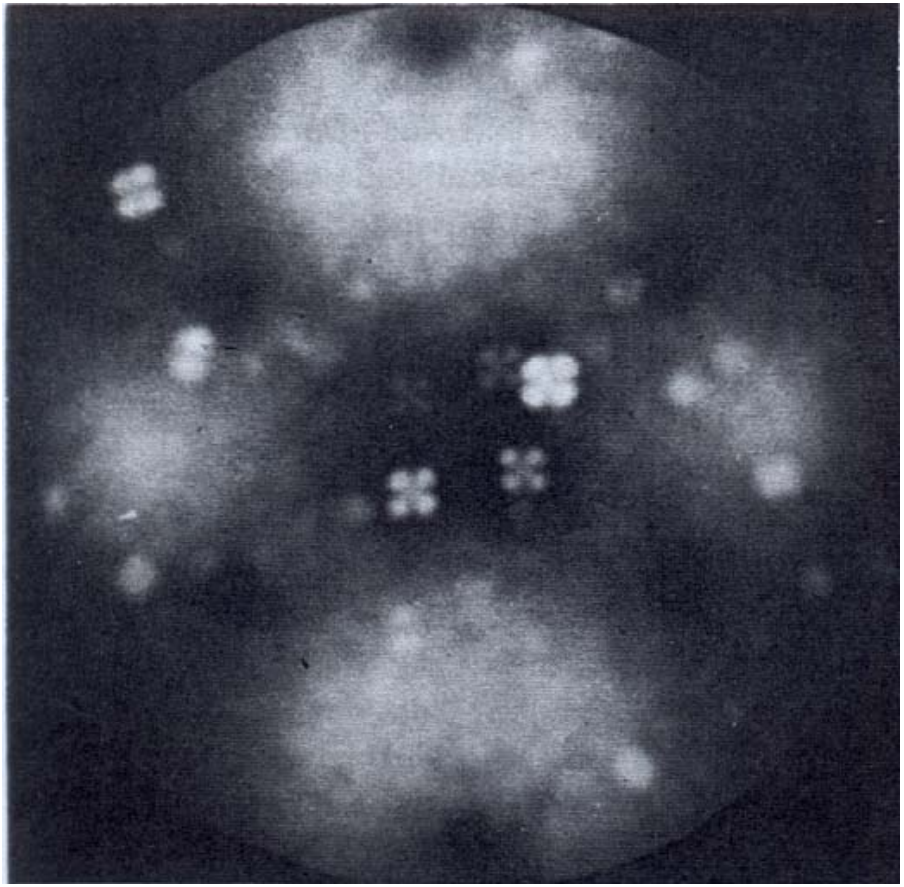
Aus: R. Gomer: Field Emission and Field Ionisation
(Harvard University Press, Cambridge 1961)

Fig.3.14

Work Function Changes by Adsorption; Imaging Molecules



FEM pattern of Ni [111] tip,
clean (top)
hydrogen covered (bottom)



FEM of Cu- phthalocyanine on W tip

Fig.3.15

High Brightness Field Emitterss

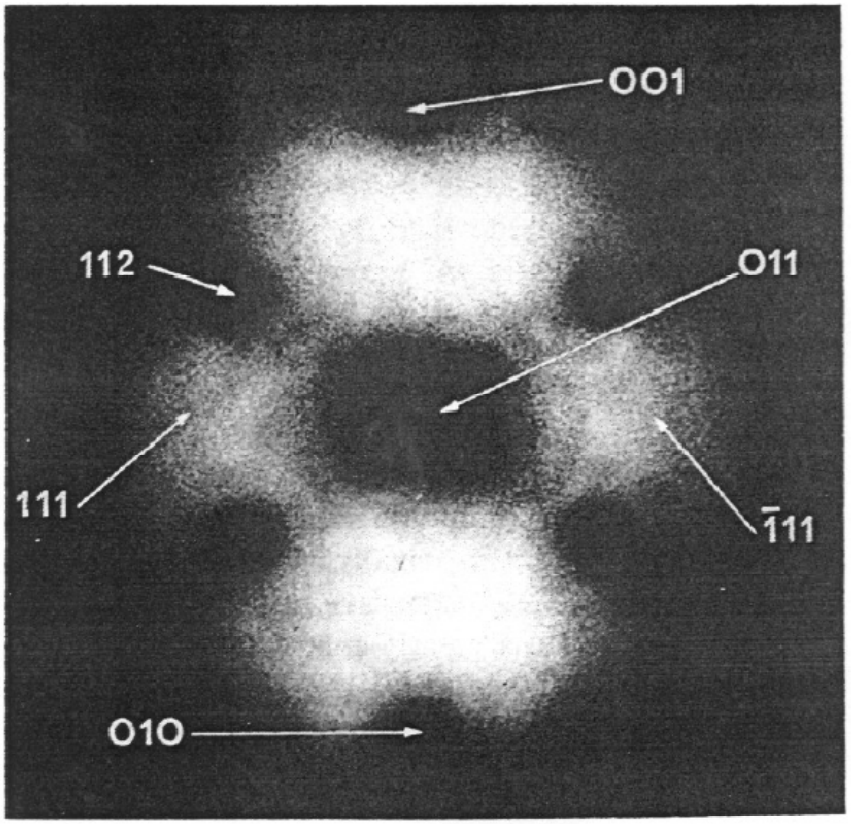
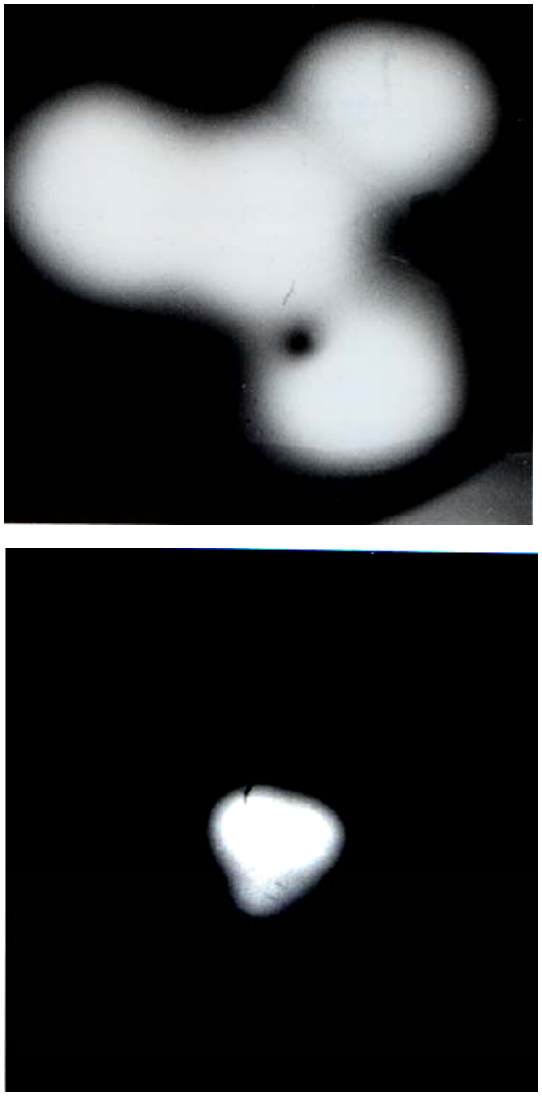


Fig. 2.3. Field-emission micrograph of a clean annealed tungsten emitter. (Courtesy of Dr. A. J. Melmed, U.S. National Bureau of Standards.)

[110] tip



[111] tip, two annealing steps
high brightness small spot emitter

Fig.3.16

Photo Emission Electron Microscopy (PEEM)

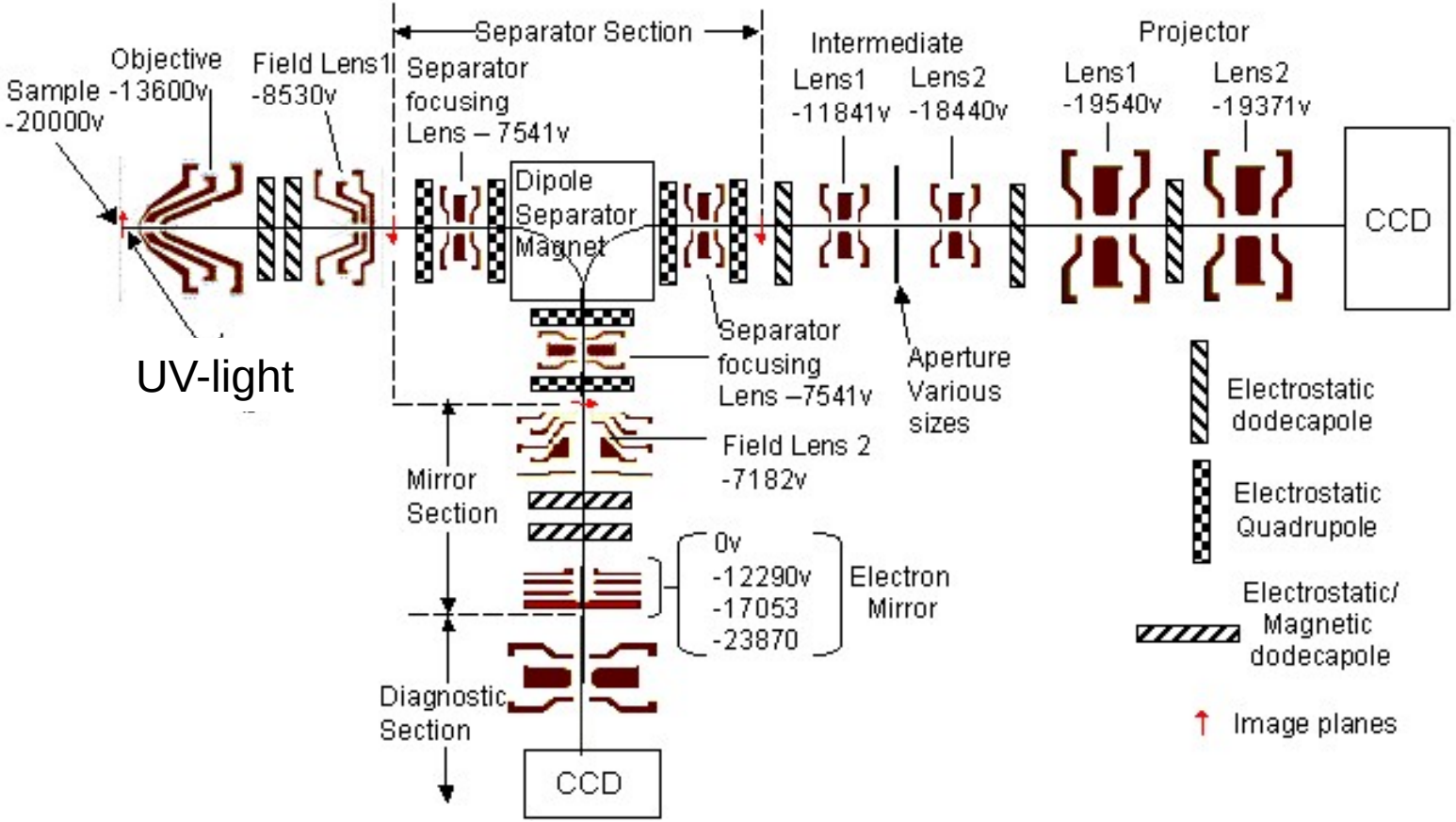


Fig. 3.17

Graphene growth o Ir(111)

growth at 1320 K , PEEM, bright = graphene

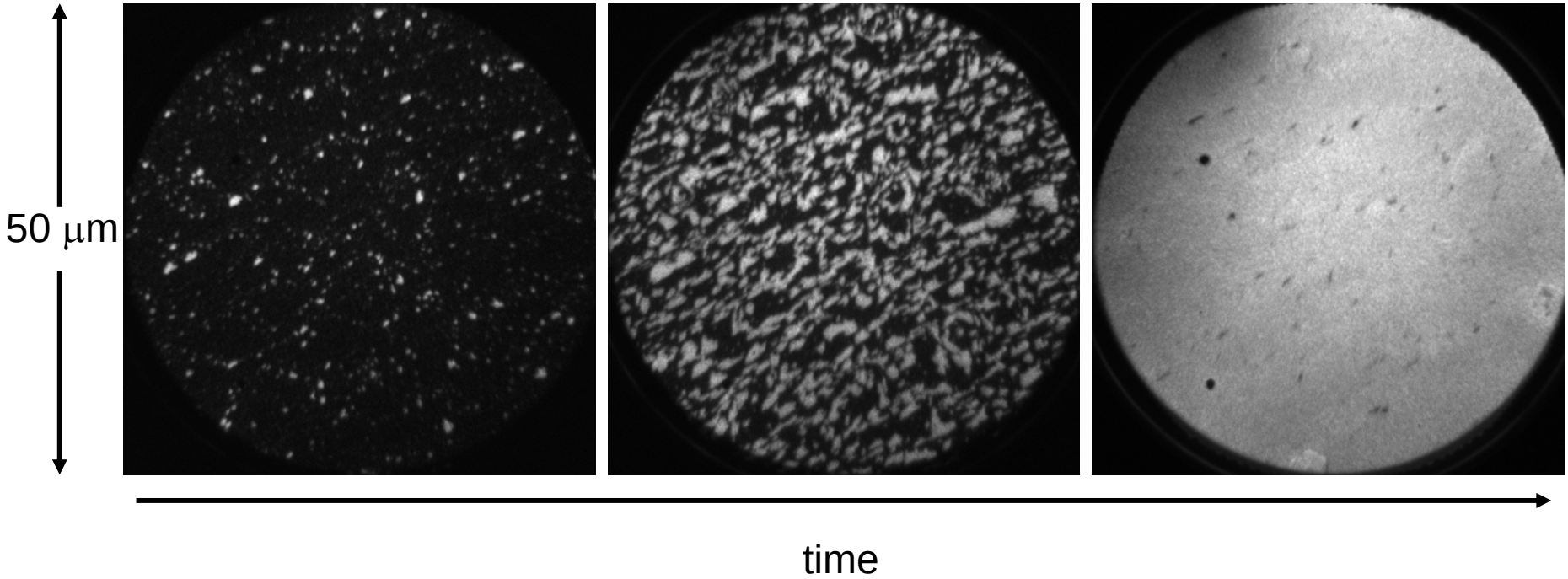
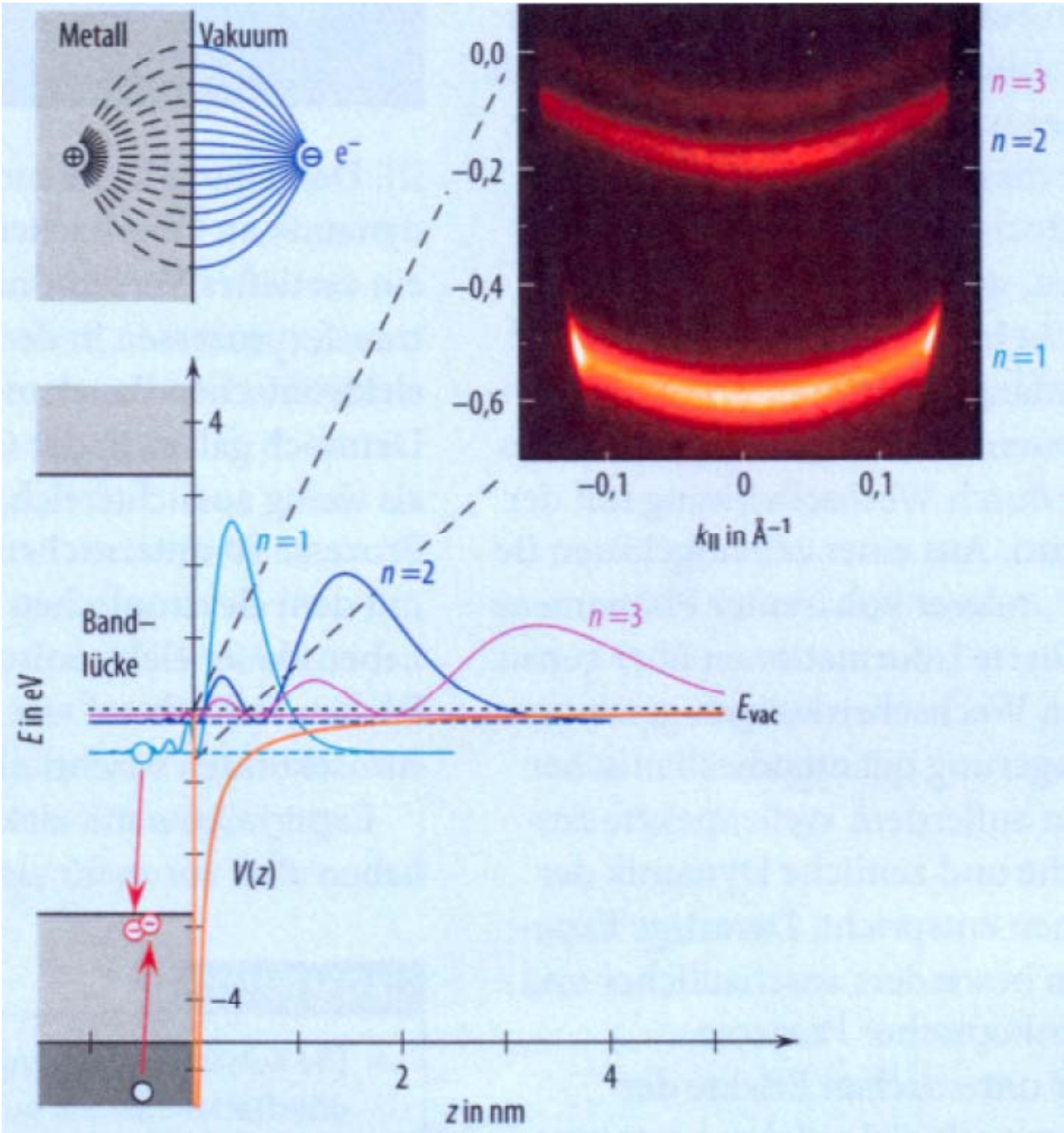


Fig. 3.18

PEEM measurements performed in Duisburg
Dirk Wall, Niemma Buckanie, Frank-J. Meyer zu Heringdorf, Johann Coraux

Image Potential States on Cu(001)



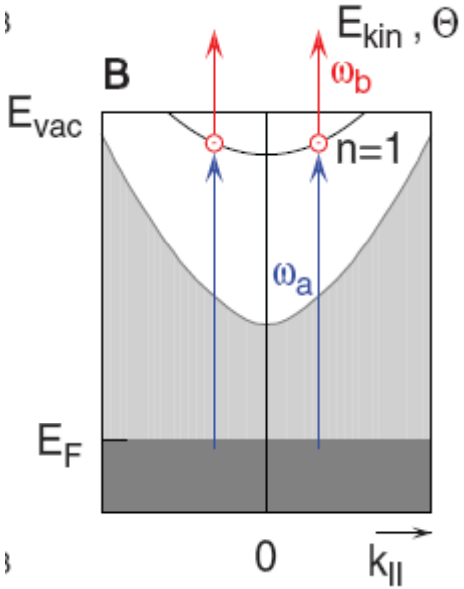


Fig. 3.19

J. Güdde, U. Höfer
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Classical Visualization of an Image Potential State

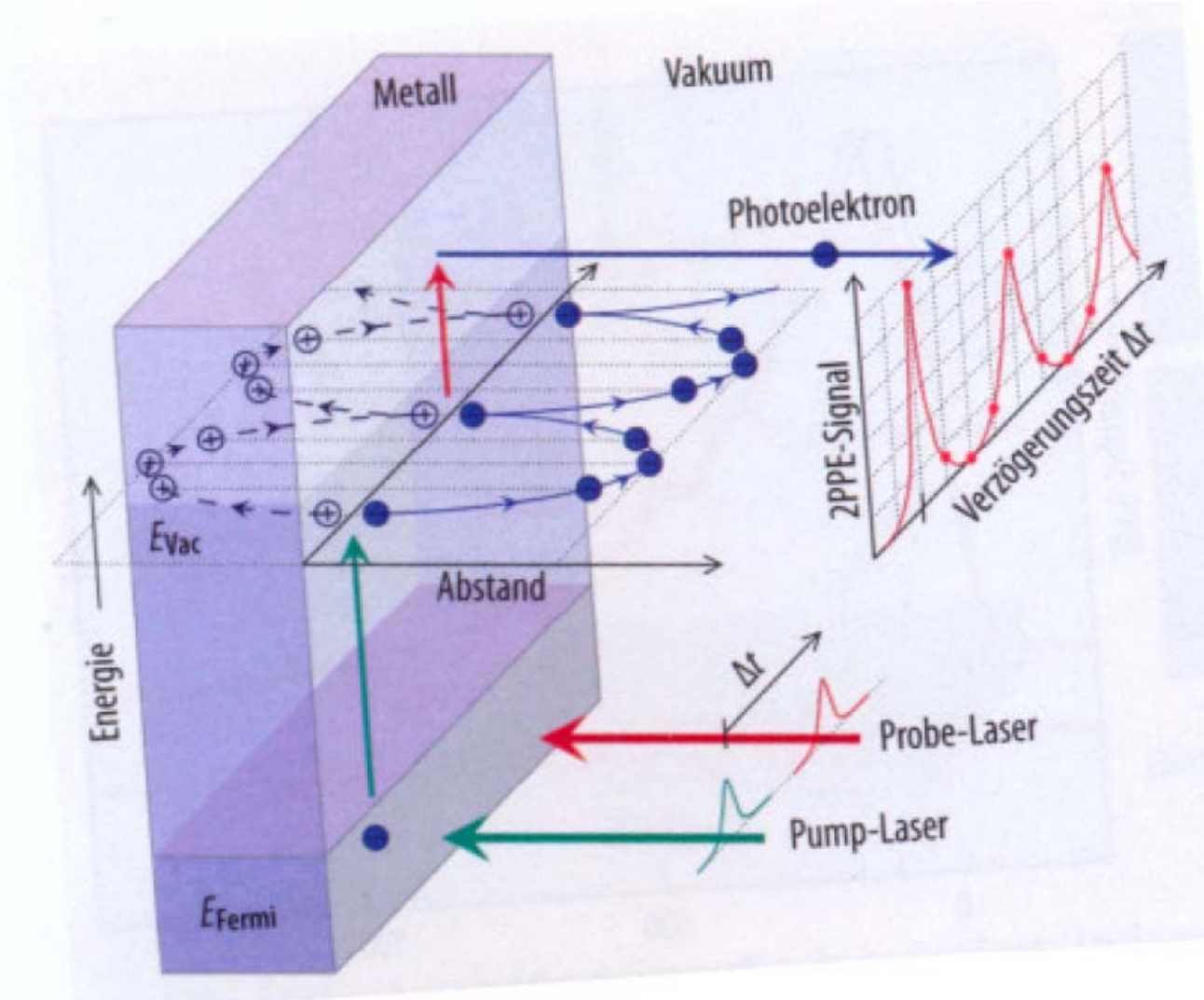

Fig. 3.20

Emission Probability as a Function of Probe Delay Δt

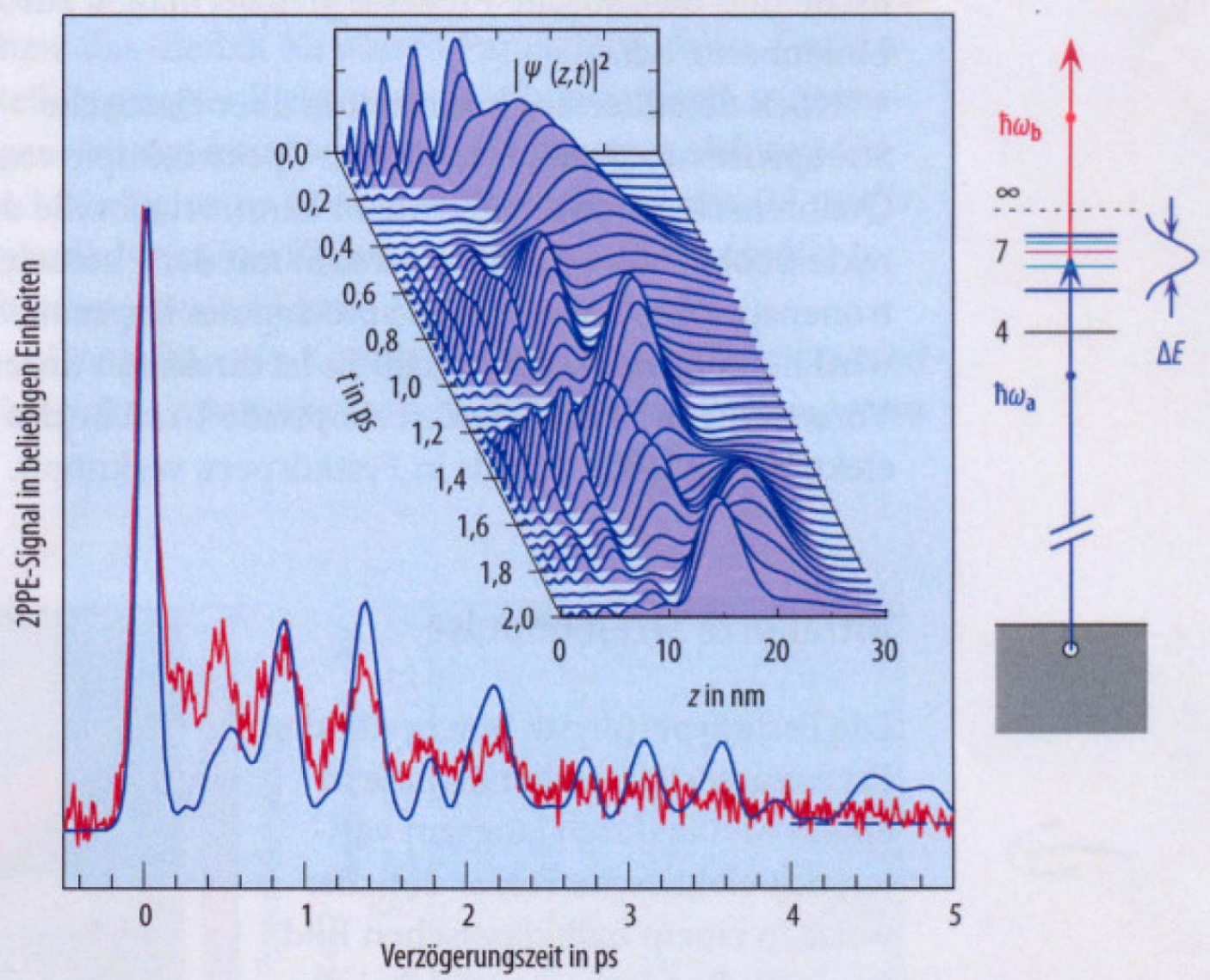

Fig. 3.21

Relaxation Mechanisms of an Electron in an Image Potential State with $k_{\parallel} \neq 0$

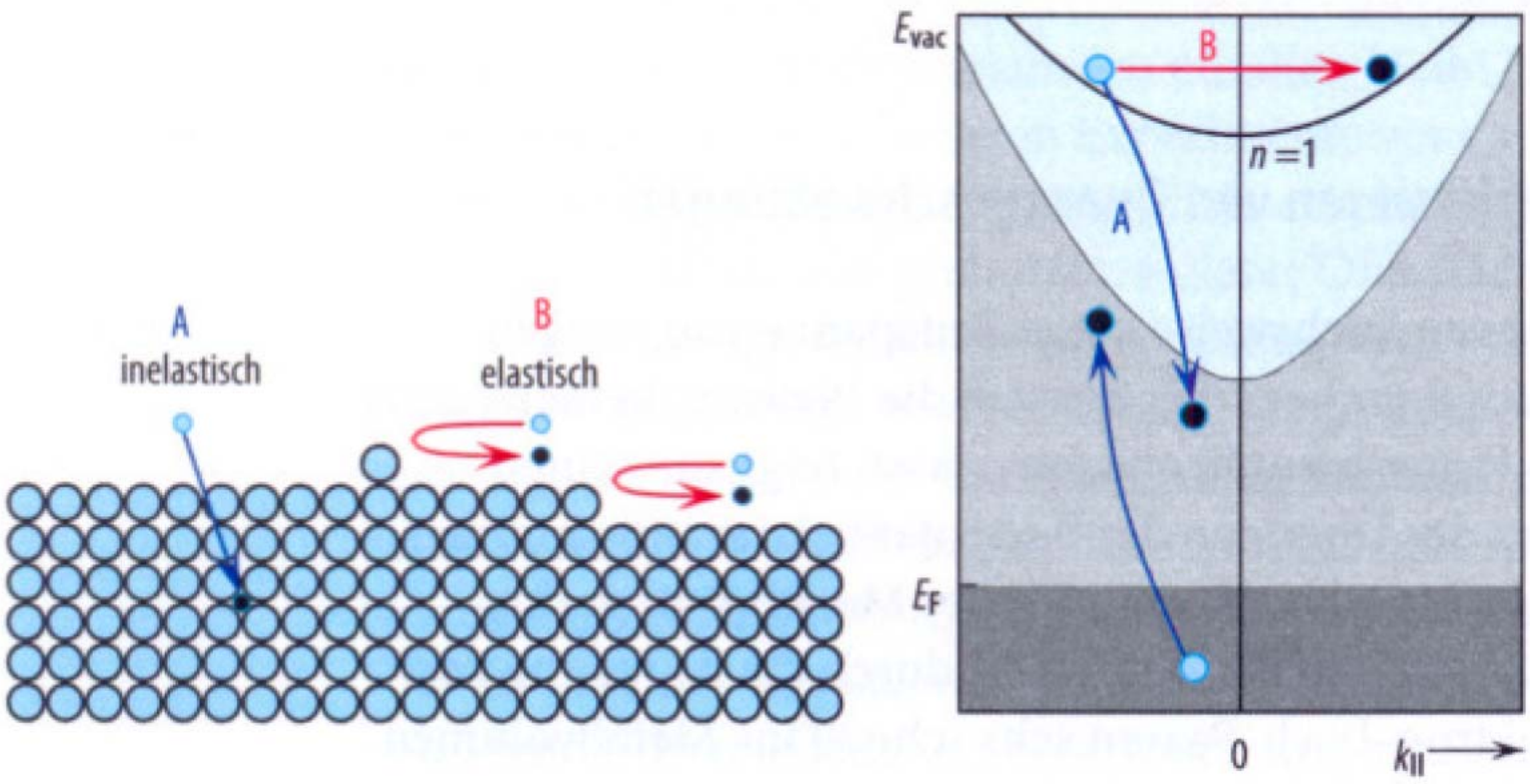

Fig. 3.22

Nonequilibrium Distribution of Electrons Due to an External Field

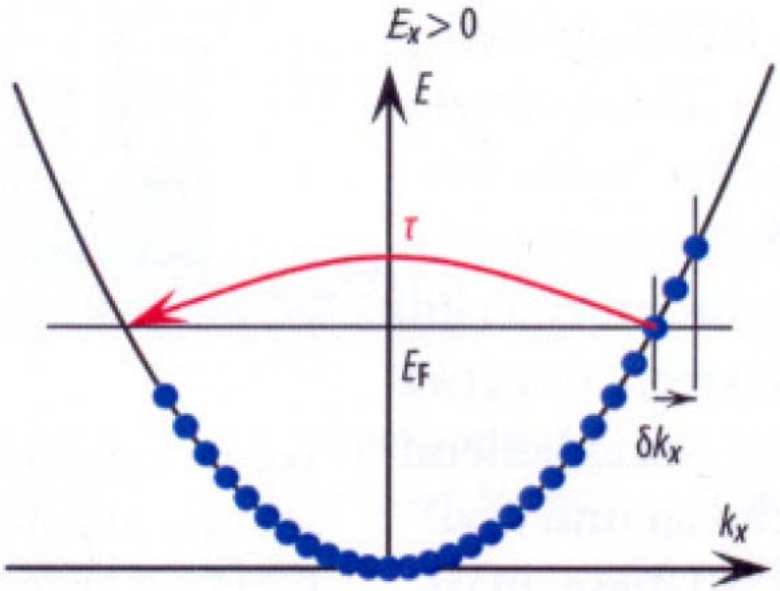

Abb. 5 Ein konstantes elektrisches Feld E_x führt zu einem Besetzungsunterschied im Impulsraum und damit zur Ausbildung eines elektrischen Stromes in einem Metall.

Fig. 3.23

Elastic Relaxation of the Image State Current Pulse

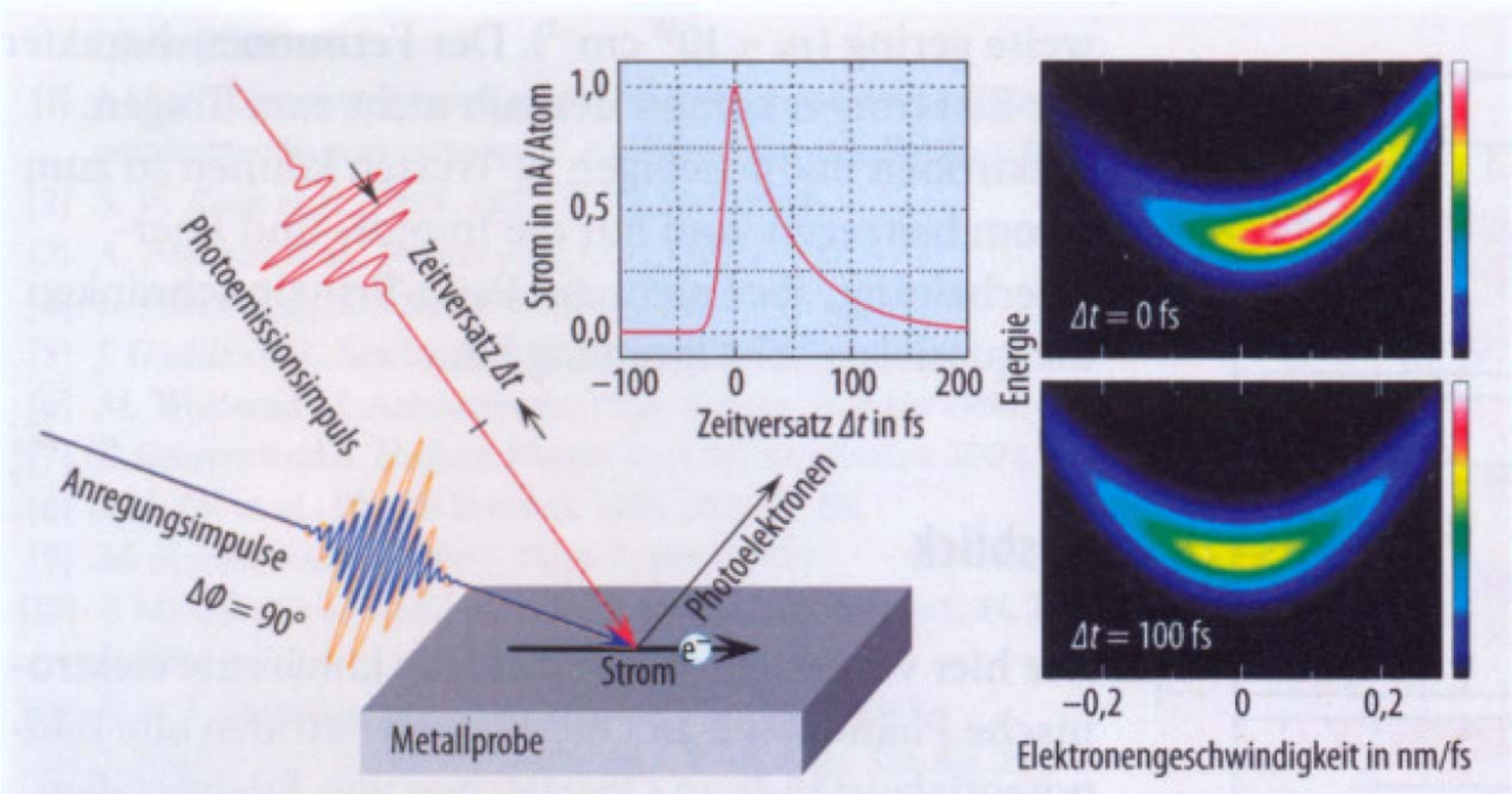

Fig. 3.24