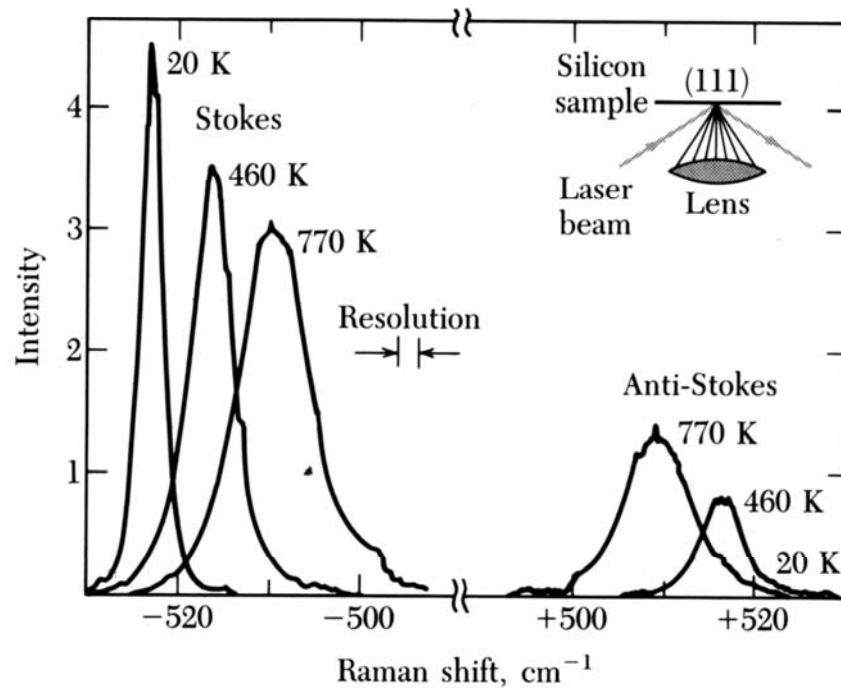


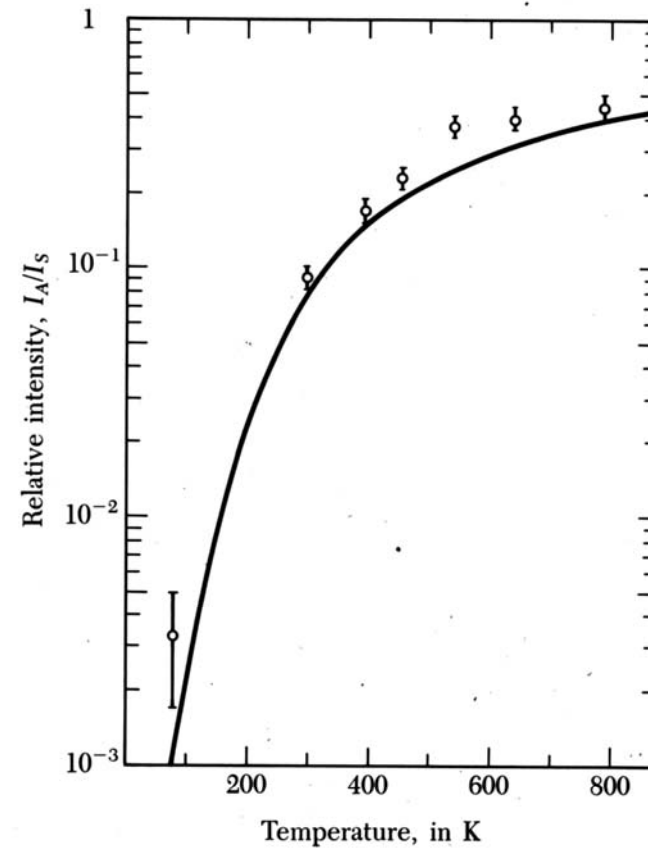
# Dielektrische Eigenschaften

## Raman-Effekt

Raman-Spektrum von Si(111)



Verhältnis Anti-Stokes-/Stokes-Linie für Si(111)

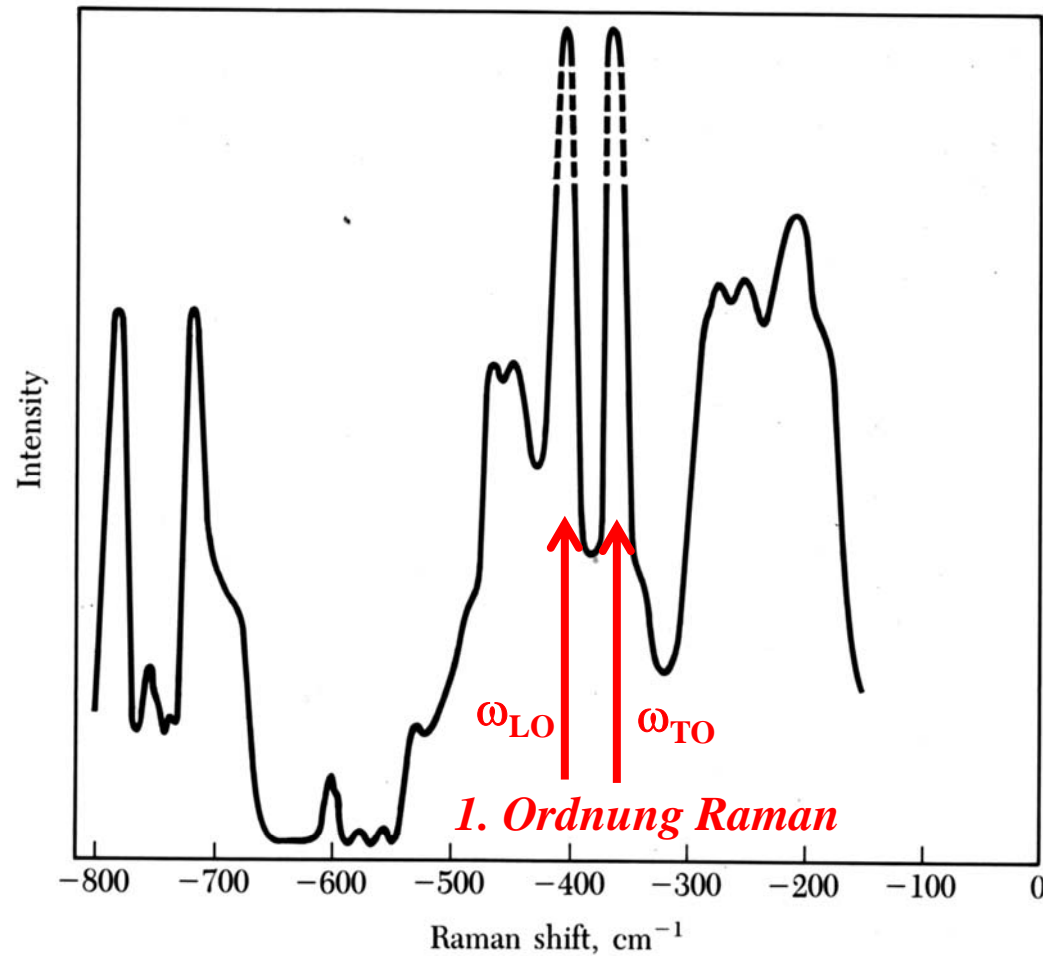


(Quelle: Ch. Kittel, Introduction to Solid State Physics, Wiley, New York)

# Dielektrische Eigenschaften

## Raman-Effekt

### Raman-Spektrum von GaP bei 20 K

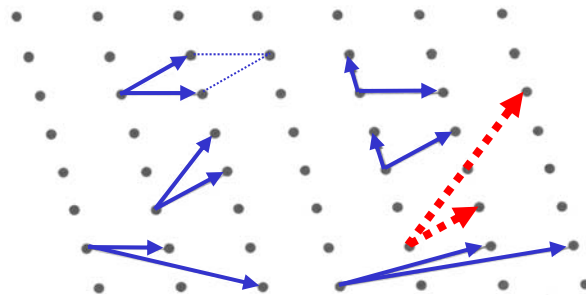


(Quelle: Ch. Kittel,  
*Introduction to Solid  
State Physics*, Wiley,  
New York)

# Oberflächenphysik

## Bravais-Gitter in zwei Dimensionen

### Parallelogramm-Gitter

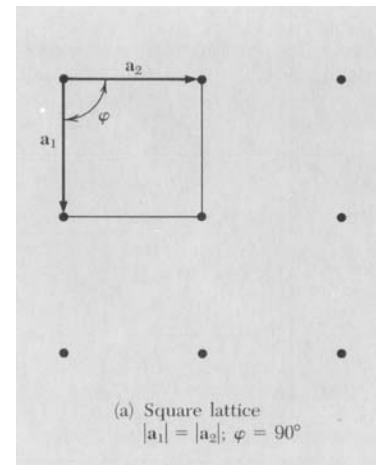


Beispiele primitiver Gittervektoren (blau).  
Das rote (gestrichelte) Pfeilpaar ist nicht primitiv!

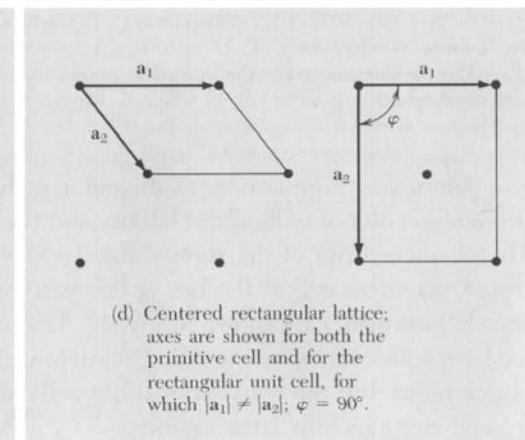
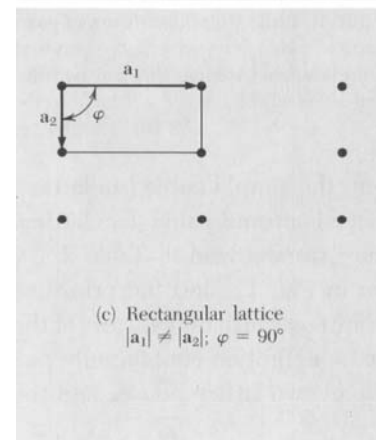
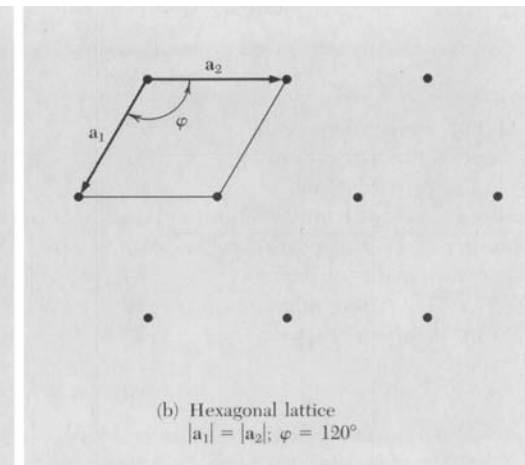
### fünf Bravais-Gitter:

- Parallelogramm-Gitter:  $a_1 \neq a_2, \varphi \neq 90^\circ$
- Quadrat-Gitter:  $a_1 = a_2, \varphi = 90^\circ$
- Rechteck-Gitter:  $a_1 \neq a_2, \varphi = 90^\circ$
- hexagonales Gitter:  $a_1 = a_2, \varphi = 120^\circ$
- zentriertes Rechteck-Gitter:  $\vec{a}_1 \cdot \vec{a}_2 = a_1^2/2$

### Quadrat-Gitter



### hexagonales Gitter



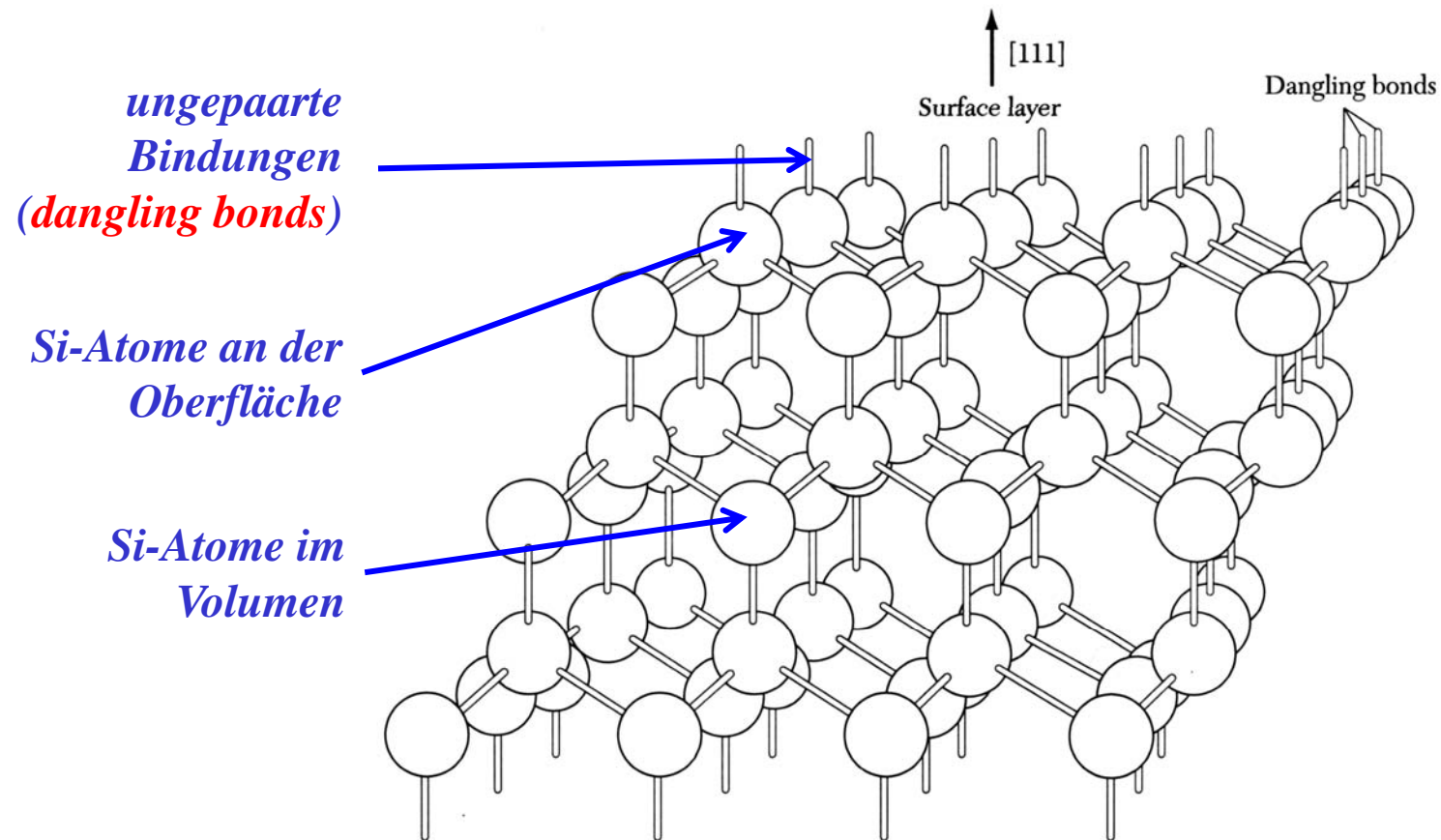
### Rechteck-Gitter zentriertes Rechteck-Gitter

(Quelle: Ch. Kittel, Introduction to Solid State Physics, Wiley, New York)

# Oberflächenphysik

## dangling bonds

### (111)-Oberfläche (Diamant-Struktur)



(Quelle: Ch. Kittel, Introduction to Solid State Physics, Wiley, New York)

**Figure 1** Dangling bonds from the (111) surface of a covalently bonded diamond cubic structure. (After M. Prutton, *Surface physics*, Clarendon, 1975.)

# Oberflächenphysik

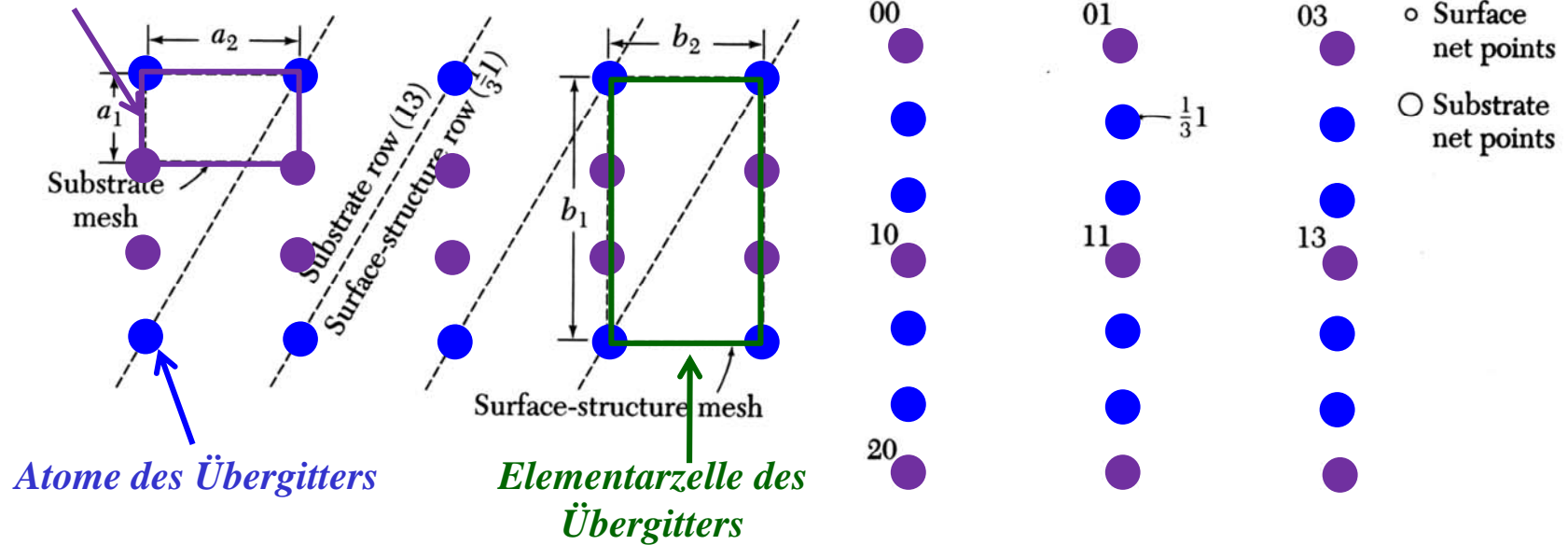
## Überstrukturen

### (3×1)-Überstruktur

*Elementarzelle des  
Oberflächengitters*

*Realraum*

*reziproker Raum*

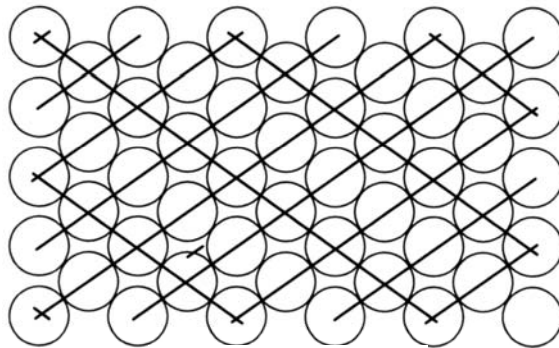


(Quelle: Ch. Kittel, Introduction to Solid State Physics, Wiley, New York)

# Oberflächenphysik

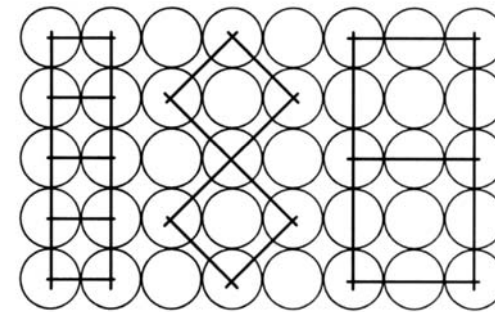
## Überstrukturen

**bcc(110)-Oberfläche**



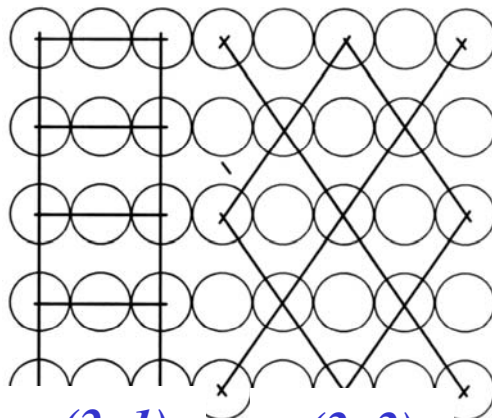
$p(2 \times 1)$

**fcc(100)- oder bcc(100)-Oberfläche**



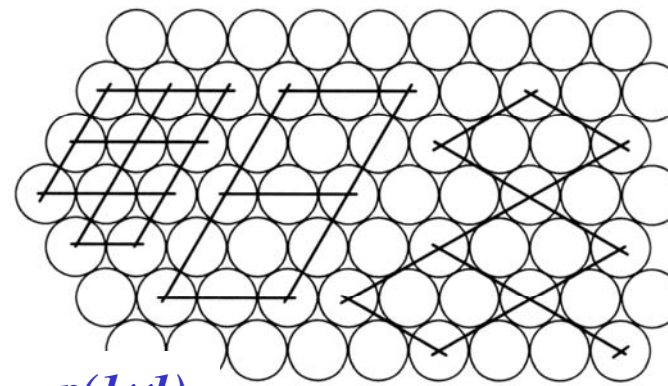
$p(1 \times 1)$   $c(2 \times 2)$   $p(2 \times 2)$

**fcc(110) Oberfläche**



$p(2 \times 1)$   $c(2 \times 2)$

**fcc(111)- oder hcp(0001)-Oberfläche**



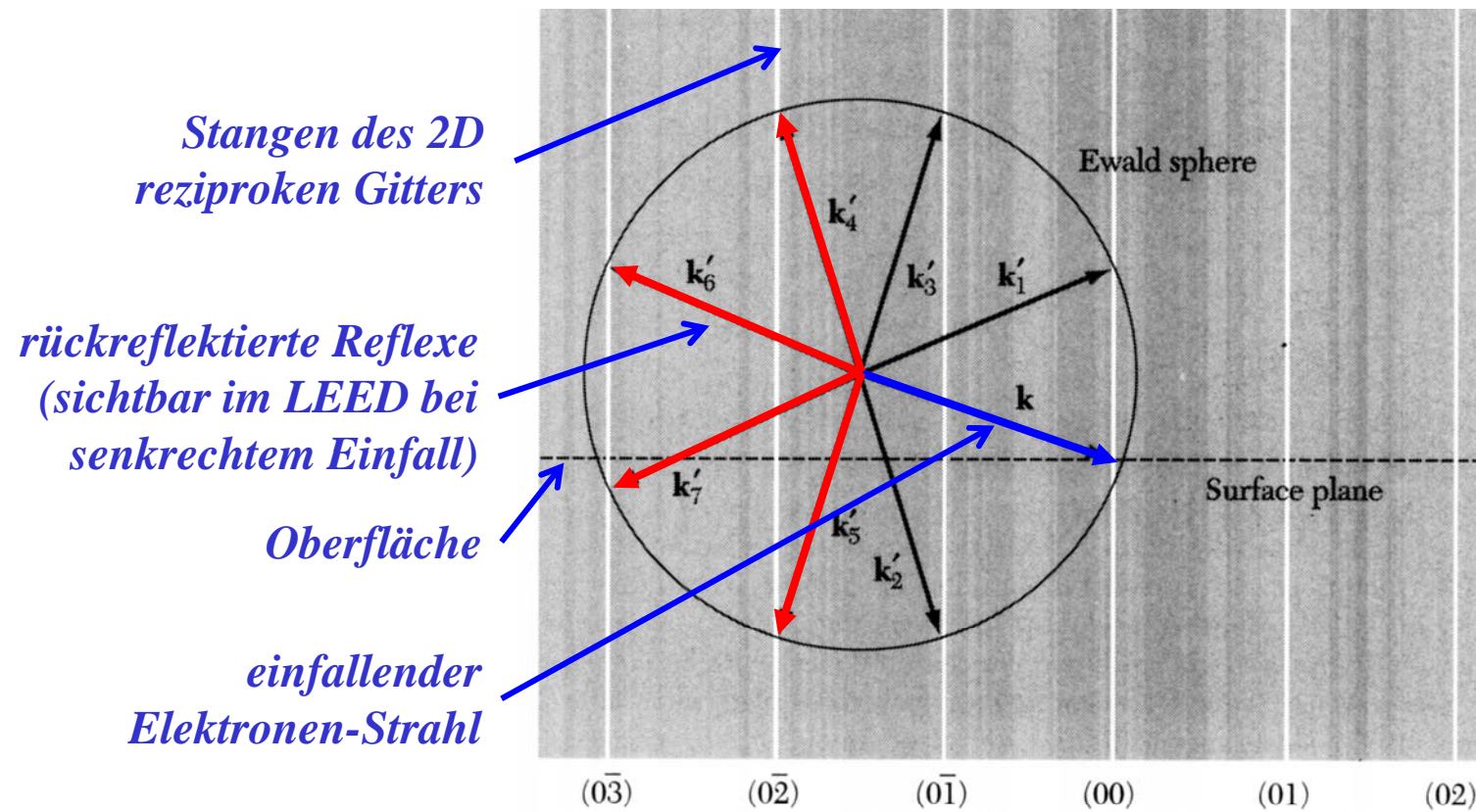
$p(1 \times 1)$   $p(2 \times 2)$   $(\sqrt{3} \times \sqrt{3})R30^\circ$

(Quelle: Ch. Kittel,  
Introduction to Solid  
State Physics, Wiley,  
New York)

# Oberflächenphysik

## low-energy electron diffraction (LEED)

### Ewald-Konstruktion für Oberflächen



(Quelle: Ch. Kittel, Introduction to Solid State Physics, Wiley, New York)