Reminder: Custa latrice, Metal bonds (1) Real and Reciprocal Latrices. latice: periodic arrangement of about Rurw = ua + vb + wē "Real space" M,N,W & Z Recipocal space: Forier (conjugate) space of the real space Ghbl = h a* + k b+ + l c* with $\vec{a} \cdot \vec{a}^* = \vec{b} \cdot \vec{b}^* = \vec{c} \cdot \vec{c}^* = 2\pi$ and $\vec{b} \cdot \vec{a}^* = \vec{c} \cdot \vec{a}^* = 0$ $\frac{2\pi}{3} = (5 \times c^{2}) \times \frac{2\pi}{V} \quad \text{whit cell}$ $\frac{2\pi}{V} = (c \times a) \times \frac{2\pi}{V} \quad \text{Uolume}$ $\vec{ct} = (\vec{a} \times \vec{b}) \cdot \frac{2\pi}{4}$ To Ta * Wigner-Seitz Cell = Assembly of points which are closer from the origin than from any other point of the lattice Wigner-Seitz Cell of the oquare lattice => First Brillouin Zone 13 the Wigner-Seitz cell of the reciprocal space. 0 Ex: Doubling ef the unit cell in real space (case of Antiferromagnetism) doubling of the unit Cell on the real space BE becomes twice Real Space Special (high symmetry) pints Origin of the reciprocal space De gamme point = (0,0,0)

Be corner M

Brillowin dane edge

T Dispusion (e.g. phonons) (2) Netallic State ~ Metallic bonding « Conductions are shared Between all the atoms => delocalized electrons a delocalited act as a glue that holds together the comic lettice. . Few consequences: i) non-directional bands = metals are ductile and malbable iii) voy good electrical and heat conduction iii) Effecient screening of electromagnetic waves us metals are string Descriptions Two limits interection with ionic ptential Tree electrons Abouic Civits Eght binding model H Quentrum unedraciós neasty (Sommer feld Nade