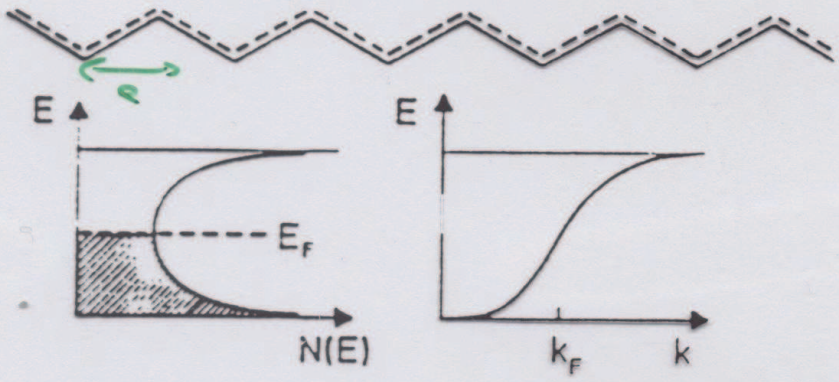
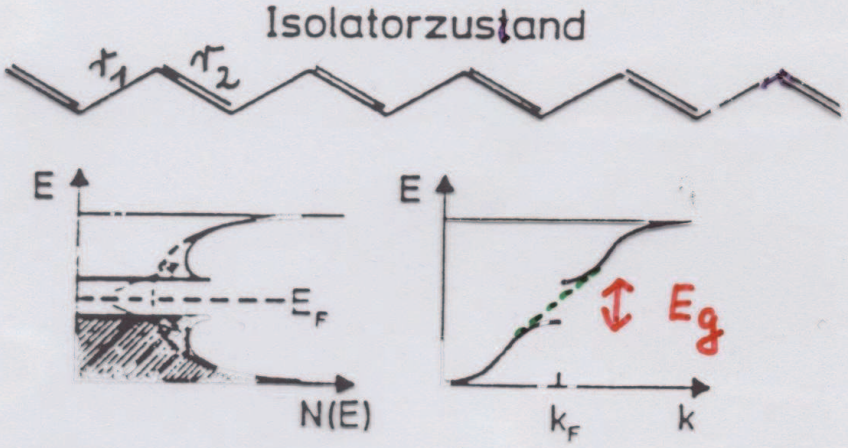
# Peierls instability in 1D

metallischer Zustand



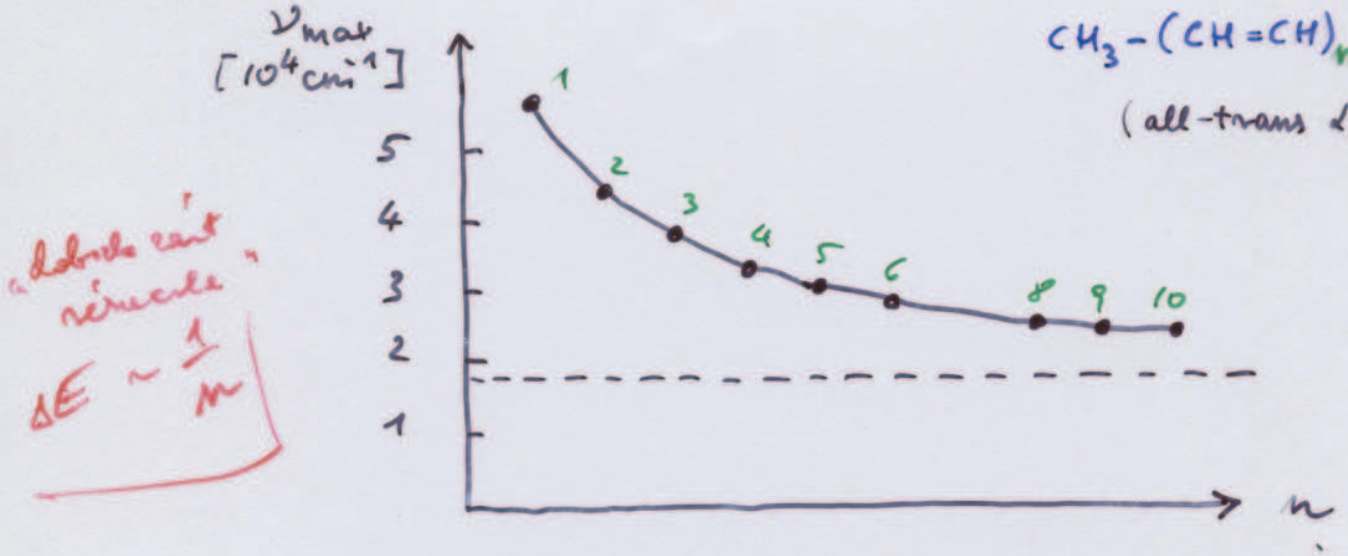

Isolatorzustand




$$\Delta r = r_1 - r_2$$

$$E_g \sim \Delta r$$

## i) gap




$CH_3-(CH=CH)_n-CH_3$

(all-trans $\alpha,\omega$ dimethylpo

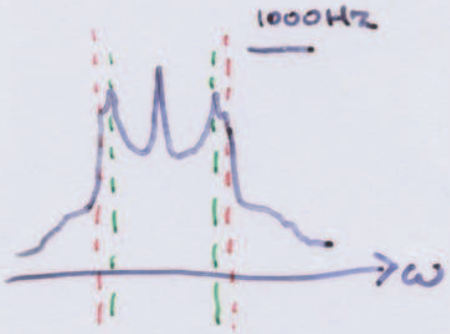
Konjugált polimerekben $E_g \approx 1{,}5-4$ eV

$H_2C$ ⟵ $=CH-C$

## ii) alternálás

$(CH)_x$ $^{13}C$ NMR (Yannoni, Clark)

Előállításnál: keverő $H-{}^{13}C\equiv{}^{13}C-H$ is!

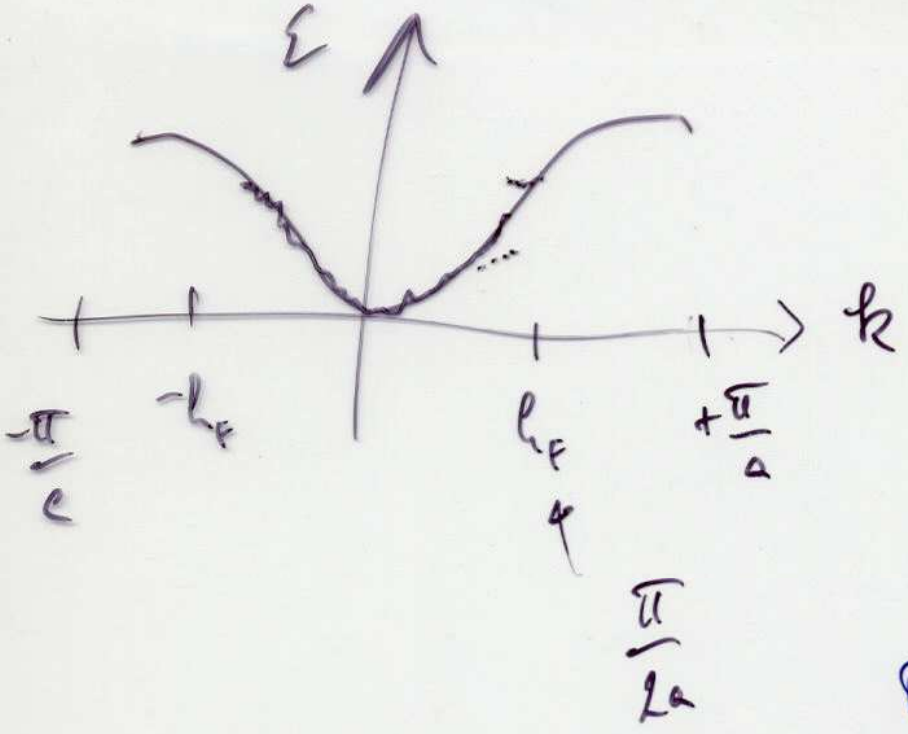



$\Rightarrow$ $r_1 = 1{,}44$ Å

$r_2 = 1{,}36$ Å

Félhasadás dipól-dipól kh. miatt

1dim instabilitások




$2k_F$

$\frac{\pi}{2a}$

$2k_e = \frac{\pi}{a} = \frac{2\pi}{2a}$

Peierls ⟷ Kohn