

K 221 - Mößbauer-effect

▷ Basis of resonance absorption

- natural linewidth



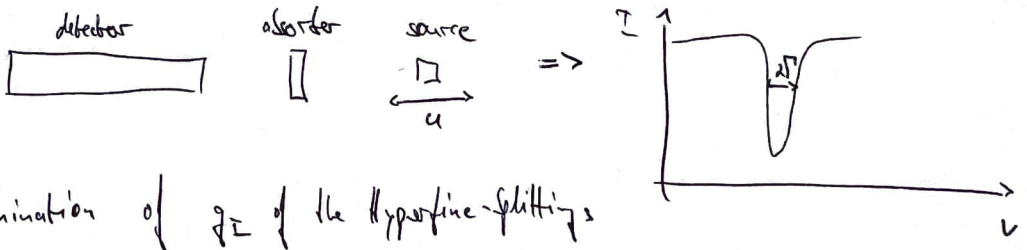
- DOPPLER broadening: LORENTZ-profile convoluted with GAUSSIAN = GAUSSIAN

DOPPLER-width \gg natural width

MÖßBAUER effect: recoilless resonance absorption; for free atoms \rightarrow line shape shifted by recoil
 \hookrightarrow in the lattice

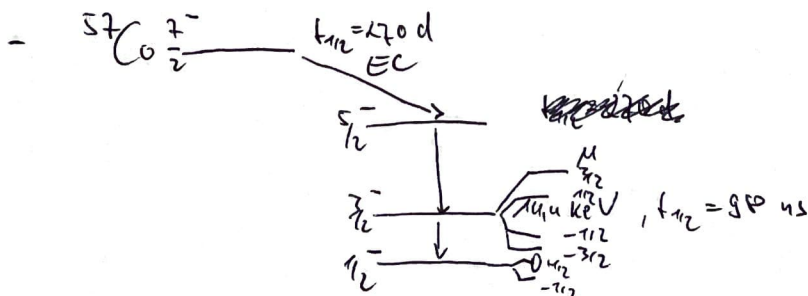
▷ DEBYE-WALLER-factor $f = \exp(-k^2 \langle x^2 \rangle_T)$ decreases with increasing E_γ
 \hookrightarrow gives "probability" of Mößbauer effect happening
 decreases with Temperature

▷ Application of the Mößbauer effect



\rightarrow determination of g_I of the hyperfine-splitting

▷ Decay scheme of ^{57}Co



- isomeric shift: emission and absorption \hookrightarrow 6 lines in the spectrum
 energy differ slightly due to HFS \rightarrow resonance dip at $k \neq 0$