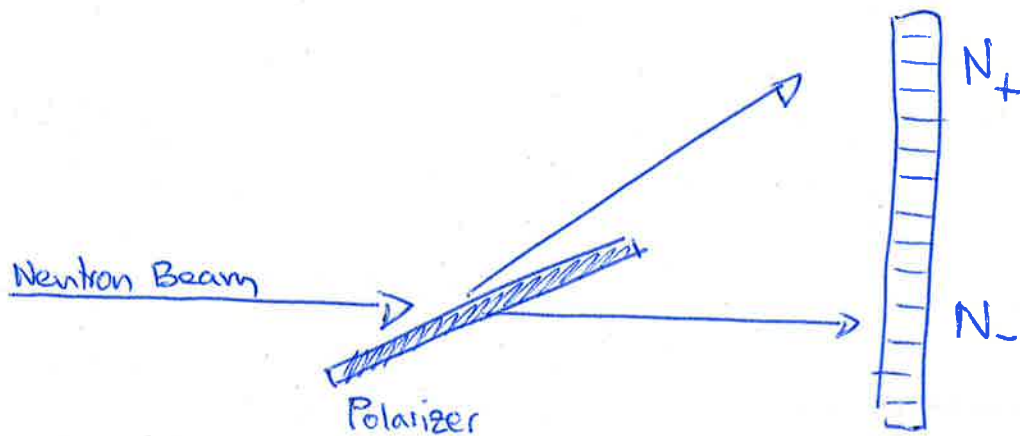


Ramsey - Fit - Function



$$\Rightarrow N_+ = a_+ + b_+ \sin(px + \phi)$$

$$N_- = a_- - b_+ \sin(px + \phi)$$

Equal period, but shifted by 180° .

$$\Rightarrow \frac{N_+ - N_-}{N_+ + N_-} = \text{Asymmetry}$$

$$= \frac{(a_+ - a_-) + (b_+ + b_-) \cdot \sin(px + \phi)}{(a_+ + a_-) + (b_+ - b_-) \cdot \sin(px + \phi)}$$

$$= \frac{\left(\frac{a_+ - a_-}{a_+ + a_-}\right) + \left(\frac{b_+ + b_-}{a_+ + a_-}\right) \sin(px + \phi)}{1 + \left(\frac{b_+ - b_-}{a_+ + a_-}\right) \sin(px + \phi)}$$

$$1 + \left(\frac{b_+ - b_-}{a_+ + a_-}\right) \sin(px + \phi)$$

⇒ Possible Fit-Function of Asymmetry:

$$A = \frac{a + b \sin(px + \phi)}{1 + c \sin(px + \phi)}$$

⇒ Invert for ϕ :

$$A + Ac \sin(px + \phi) = a + b \sin(px + \phi)$$

$$\sin(px + \phi) [Ac - b] = a - A$$

$$\phi = \arcsin \left[\frac{a - A}{Ac - b} \right] - px$$

$$\Downarrow c \rightarrow 0$$

$$\phi = \arcsin \left[\frac{A - a}{b} \right] - px$$

$\Rightarrow$ One problem in analyzing the LL data is that the determined $\chi^2 \gg 1$. Possible reasons (to be investigated) are:

- $\sum_{\text{tot}}$ is not const. $\rightarrow$ new fit function should help
- Is the detector saturated in maxima? (pixel wise)



- Is there a timing problem?

10 sec exposure, but $\pm \delta t$

How large is $\delta t / 10 \text{ sec}$ compared to Poisson statistic

- Fluctuation of beam intensity due to reactor power - but should be normalized out by taking ratios

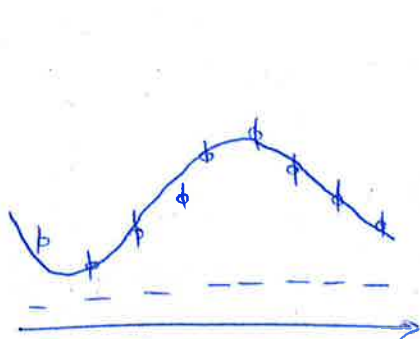
$\downarrow$
measure only
at one point
?!

- RF-Phase - Accuracy / Stability set + read

$$0.05^\circ / \text{nT} \longleftrightarrow 50^\circ / \mu\text{T}$$

$$100 \text{ sec} \rightarrow \sim 0.4 \text{ nT} \rightarrow \underline{\underline{0.005^\circ}}$$

- Magnetic Field stability during 130 sec scan (similar to RF-phase) $\sim \underline{\underline{0.1 \text{ nT}}}$



$\swarrow$ both produce an horizontal error