

$$\Delta_{31} \sim 1 \quad \checkmark$$

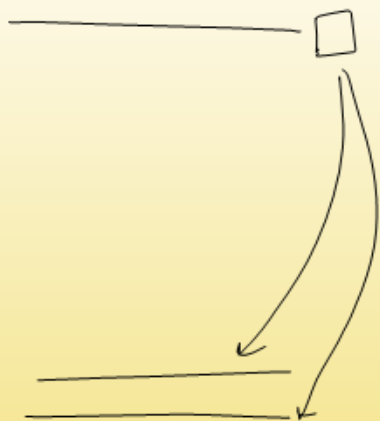
$\Delta_{atm} \checkmark$

$$\Delta_{21} \sim \frac{1}{30}$$

$$\sin \Delta_{21} \sim \frac{1}{30}$$

$$\sin^2 \Delta_{21} \sim 10^{-3} \quad \rightsquigarrow \text{negligible}$$

$\Delta_0 \times$

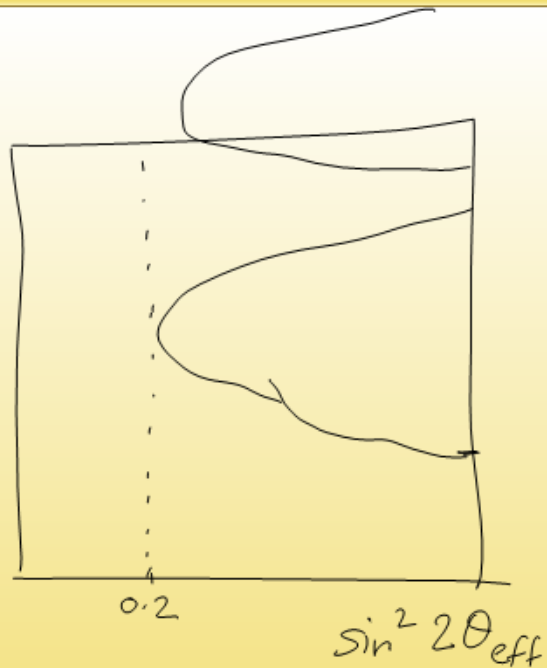


$$\Delta_{31}$$

$$\Delta_{32}$$

$$P_{\alpha\beta} = 0.2$$

~~$\sin^2 \Delta$~~   
 $\Delta$



$$\sin^2 2\theta_{eff} \sin^2 \Delta = 0.2$$

$$\sin^2 \Delta > 0.2$$

$$P_{\alpha\beta} = \sin^2 2\theta_{\text{eff}} \frac{\sin^2 \Delta}{2}$$

$$= \frac{1}{2} \sin^2 2\theta_{\text{eff}}$$

$\log \Delta$

$$\Delta = \frac{\Delta m^2 \cdot L}{4E}$$



$\Delta \gg 1$

$\sin^2 2\theta_{\text{eff}}$

log  $\Delta$

Allowed



Verboten



$$s_{12} \sim 2\theta_{\text{eff}}$$

$$P_{\alpha\beta} = \sin^2 2\theta_{\text{eff}} \sin^2 \frac{\Delta}{2}$$

has to be  $\sim 1$

Unitary matrix  $U (3 \times 3)$

$18 - 9 \rightarrow 9$   $\downarrow$   $\begin{cases} 3 \text{ angles} \\ 6 \text{ phases} \end{cases}$

$U_{4 \times 4}$

$32 - 16 \rightarrow 16$   $\begin{cases} 6 \text{ angles} \\ 10 \text{ phases} \end{cases}$