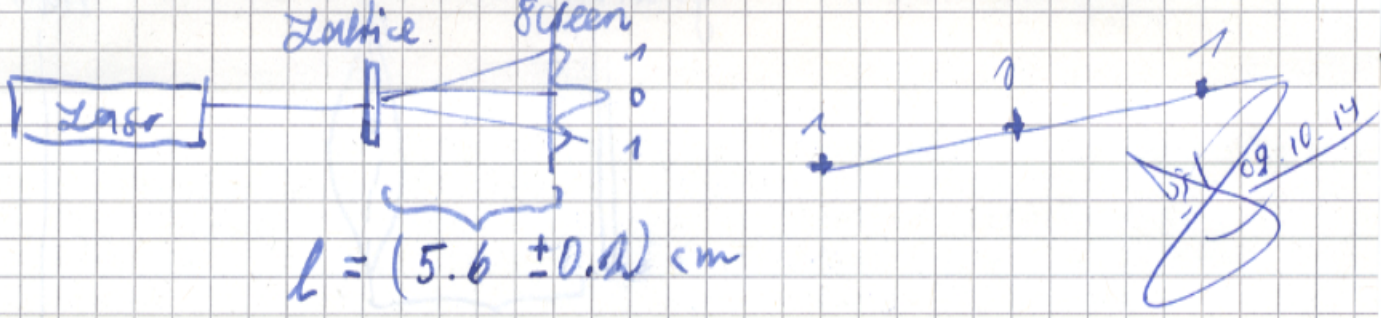
08.10.14

Ultrasonic experiment

1. Lattice constant of Sinus lattice



$l = (5.6 \pm 0.2)$ cm

0. order maximum at $x_0 = 3$ mm $y_0 = 3$mm

1. order maximum at $x_1 = \begin{cases} 48\,\text{mm} \\ -42\,\text{mm} \end{cases}$ $y_1 = \begin{cases} -1\,\text{mm} \\ +7\,\text{mm} \end{cases}$

estimation: Error: $s_{x/y} = 1$ mm

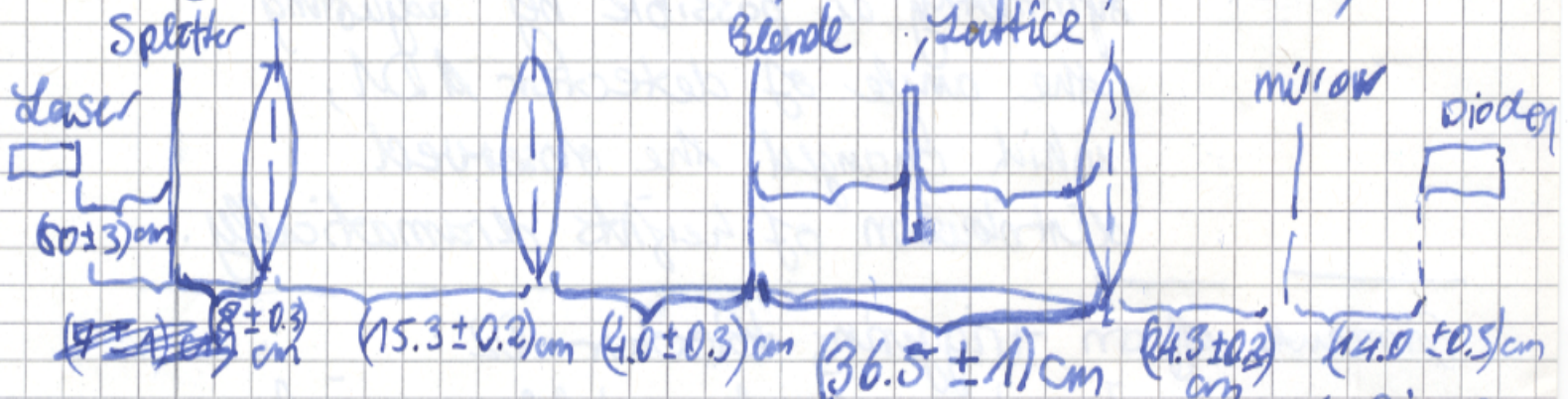
$$\Rightarrow d = \frac{1}{\lambda}\sqrt{(x_1^{(1)} - x_1^{(2)})^2 + (y_1^{(1)} - y_1^{(2)})^2}$$

$\approx$ ~~900 mm~~ 45 mm

$$\Rightarrow \theta = \arcsin\left(\frac{d}{\sqrt{l^2}}\right) = \text{~~55°~~}\ 38.8^\circ$$

$$\sin\theta_n = \frac{\lambda}{k}\,m \leftrightarrow k = \frac{\lambda}{\sin\theta_n}\,m \approx 1.0 \cdot 10^{-6}$$

2. Further modification of setup



- Also changed heights such that the two diodes don't interfere,
- Modificated such that the beam path is parallel to the setup