$$180 = \alpha + \beta + \gamma + 90$$
$$90 = \gamma + \delta$$
$$180 = \alpha + \delta + (180 - \vartheta)$$

$$\gamma = 90 - (\alpha + \beta)$$
$$\delta = 90 - \gamma$$
$$\vartheta = \alpha + \delta$$

$$\delta = 90 - (90 - (\alpha + \beta))$$
$$\delta = (\alpha + \beta)$$
$$\vartheta = 2\alpha + \beta$$

$$a = \sin(\beta) * d'$$
$$\sin(\alpha) = \frac{a}{r}$$

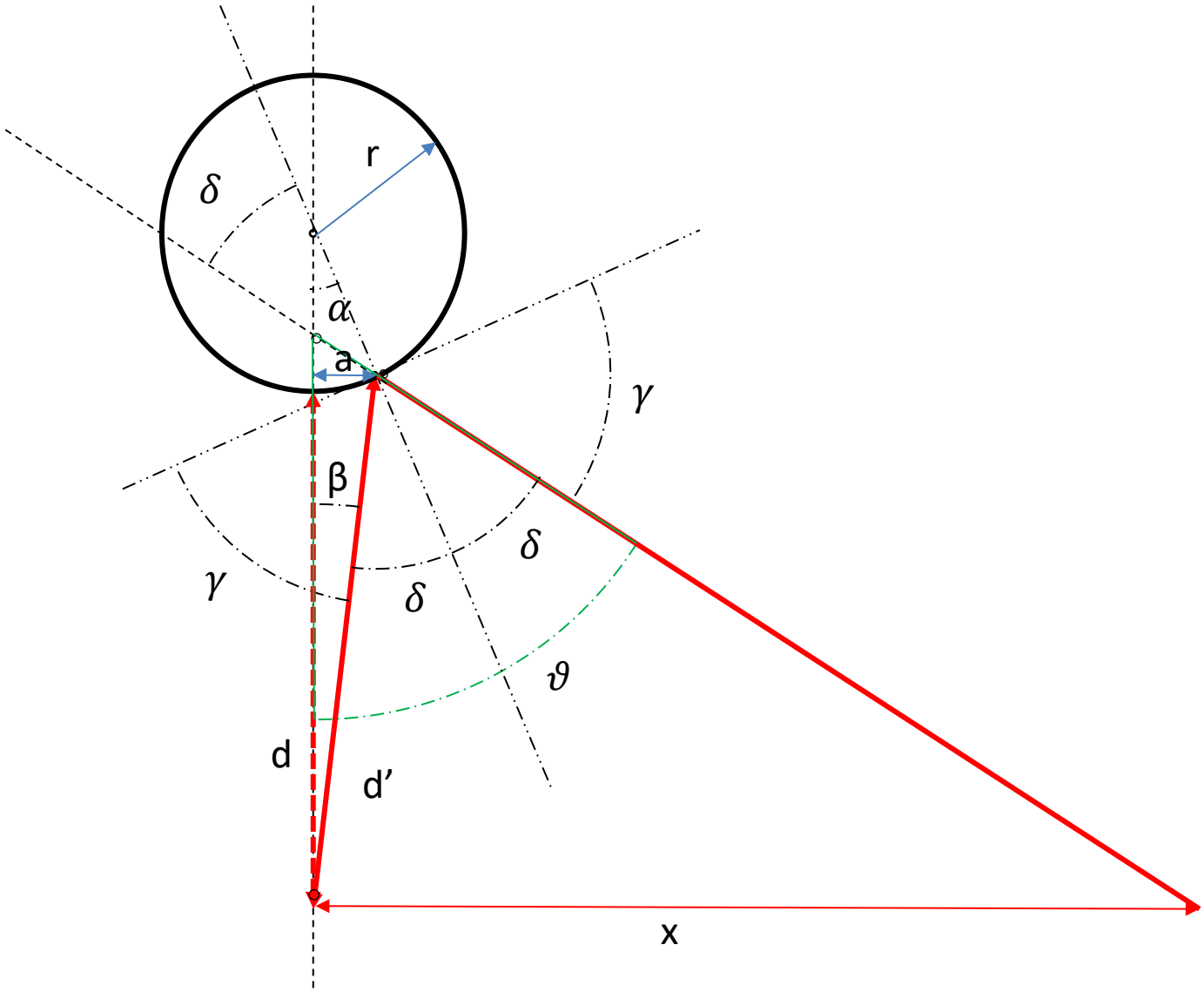
$$\sin(\alpha) = \frac{\sin(\beta) * d'}{r}$$

$$\alpha = \sin^{-1}\left(\frac{\sin(\beta) * d'}{r}\right)$$

For d>>r : d'=d

$$x = \tan(2\alpha + \beta) * d$$

Valid for d>>r



β – Half the angle under which reflection happens
x – Half the diameter of the sensor area
d – Distance Laser to Mirror

$$\beta = \tan^{-1}\left(\frac{x}{d}\right) - 2\alpha \qquad \sin(\beta) = \sin(\alpha) * \frac{r}{d}$$

Note: for visibility reasons the relations x and d are by far not realistic in the drawing