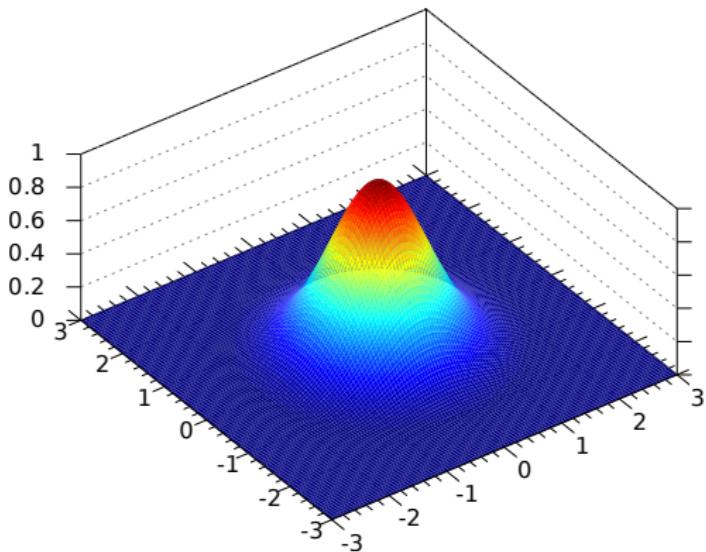
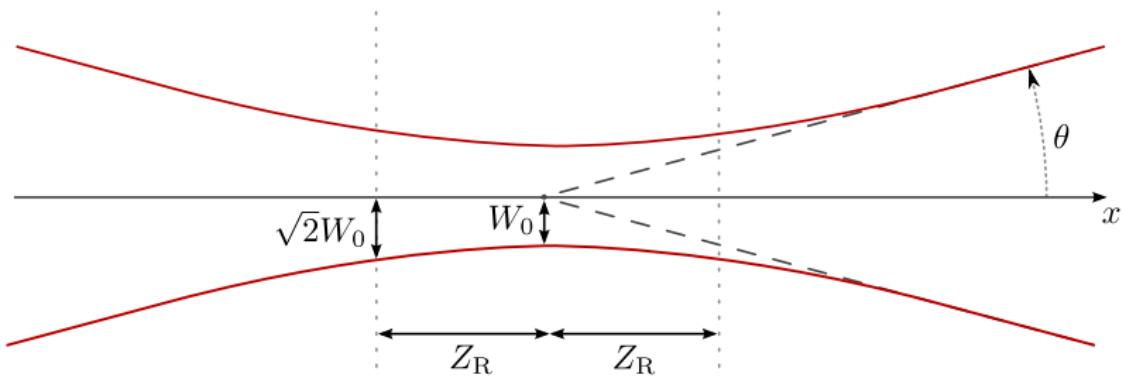


# Studies of near-gaussian beams

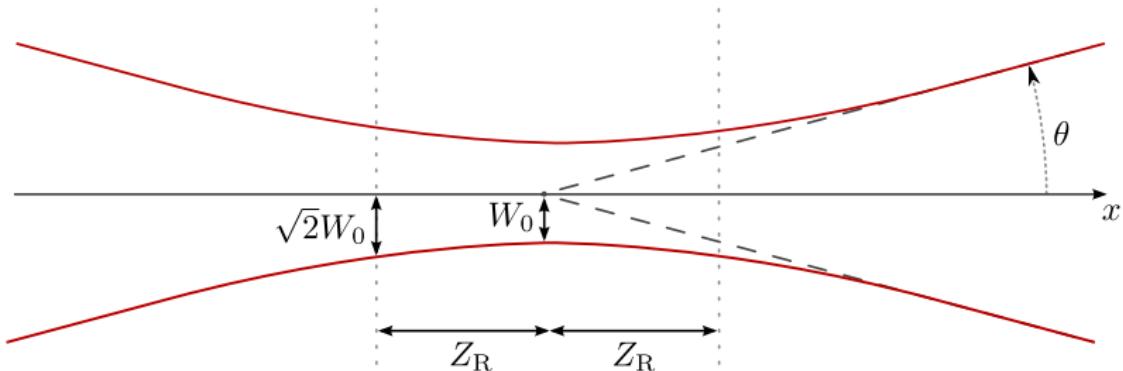


Jonas van den Brink

Ingen laserstråle har konstant bredde

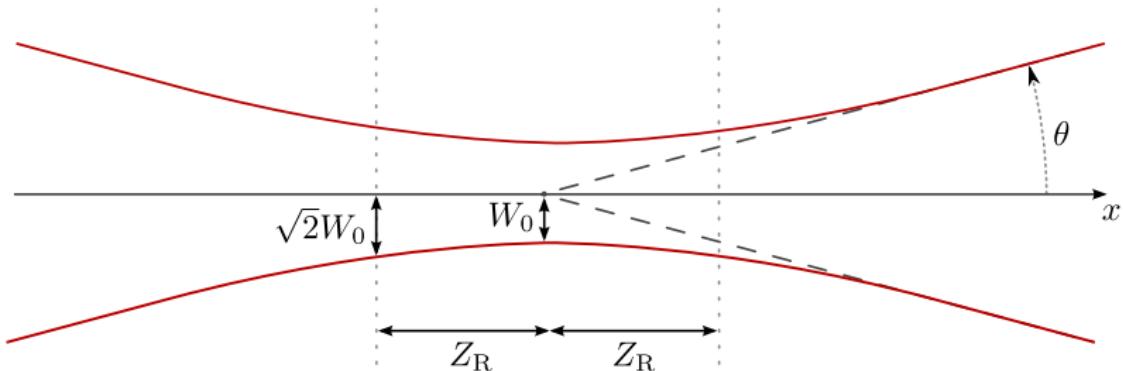


Ingen laserstråle har konstant bredde



For en gaussisk beam har vi  $\theta = \frac{\lambda}{\pi W_0}$ .

Ingen laserstråle har konstant bredde

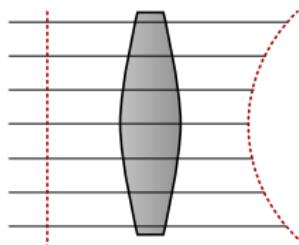


For en gaussisk beam har vi  $\theta = \frac{\lambda}{\pi w_0}$ .

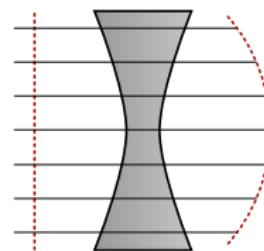
Definerer strålekvalitet

$$\text{BPP} = \theta \cdot w_0, \quad M^2 = \frac{\text{BPP}}{\text{BPP}_G}.$$

# Linser endrer krumningsradien

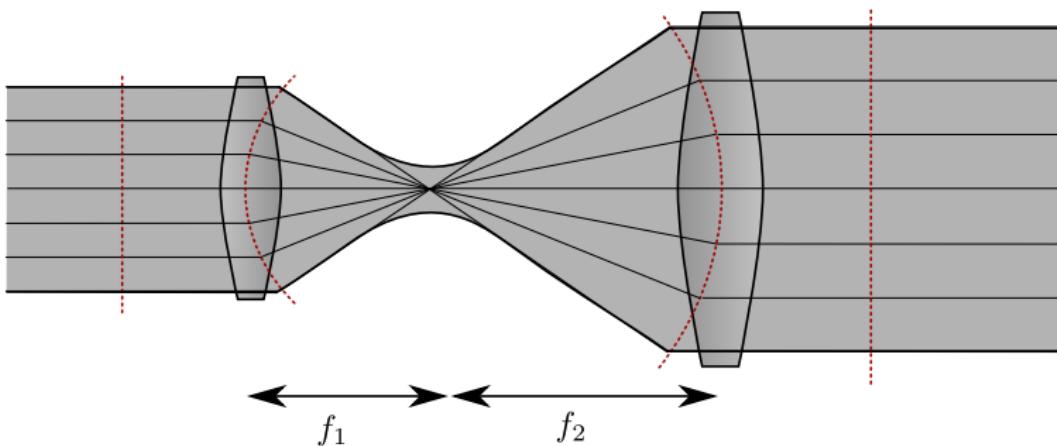


Convex

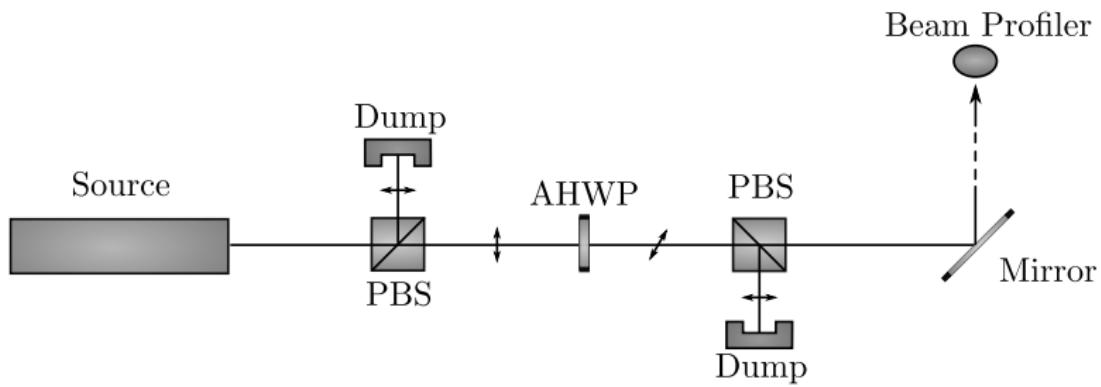


Concave

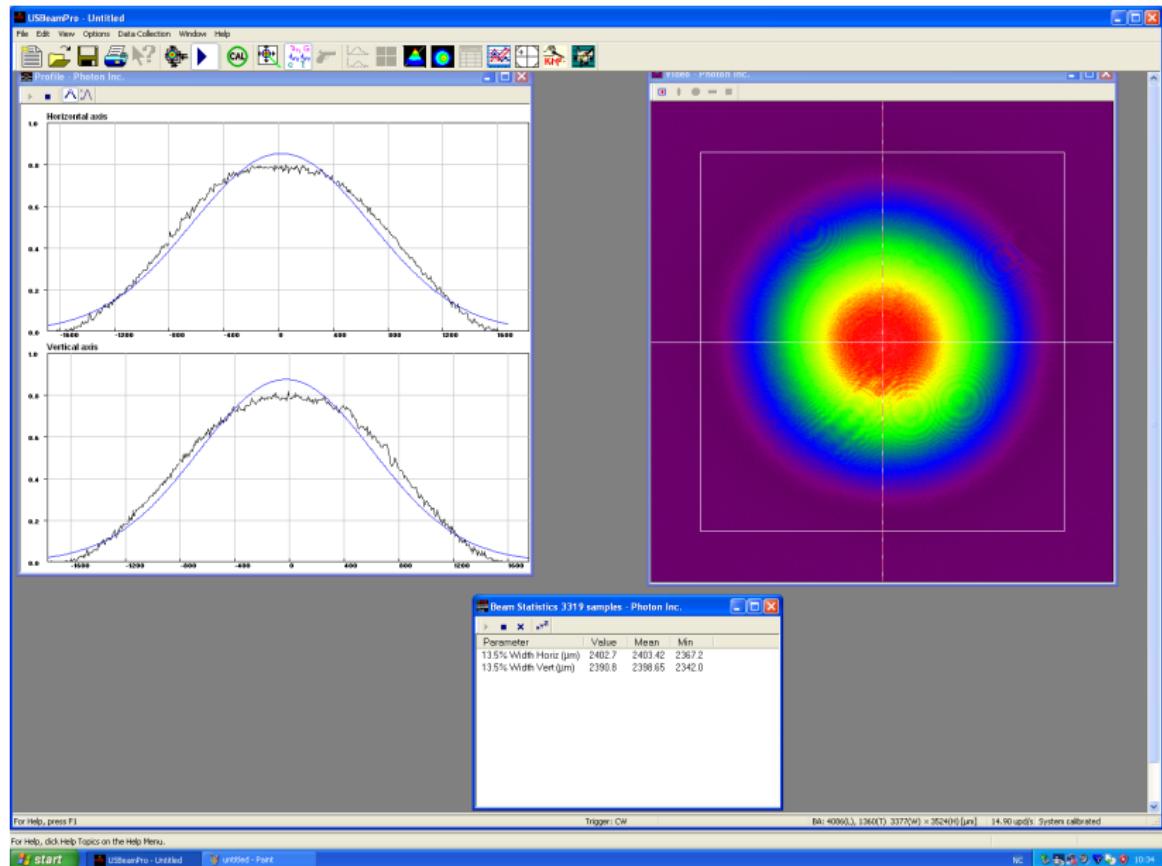
Vi kan lage en beam expander fra to bikonvekse linser



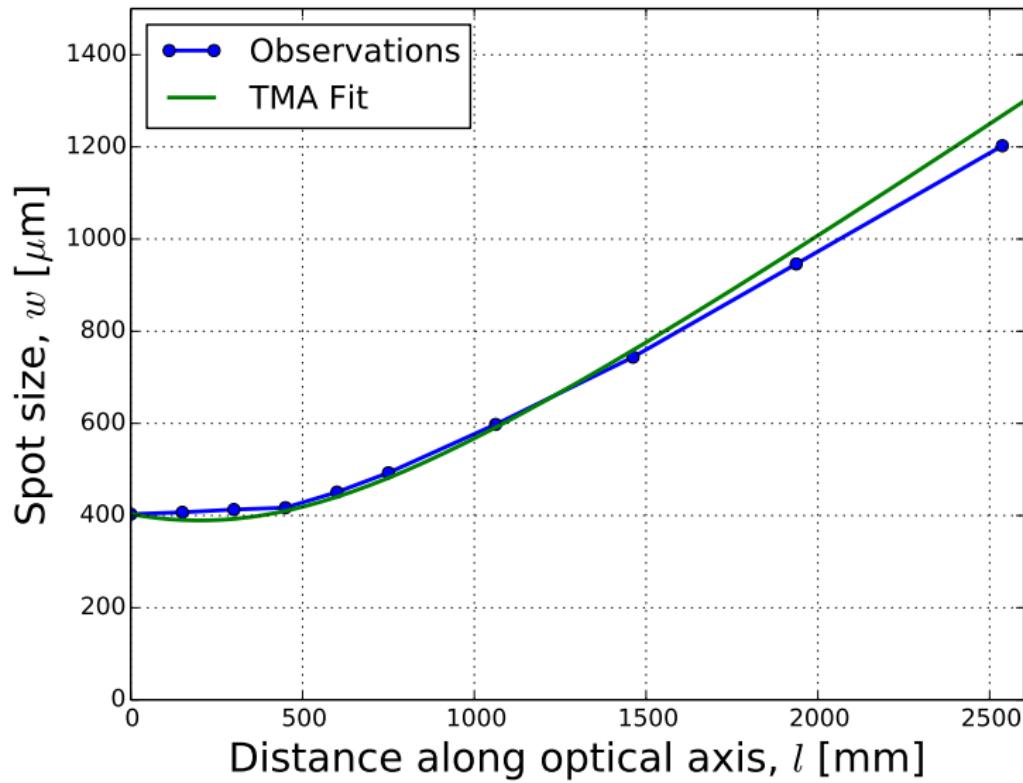




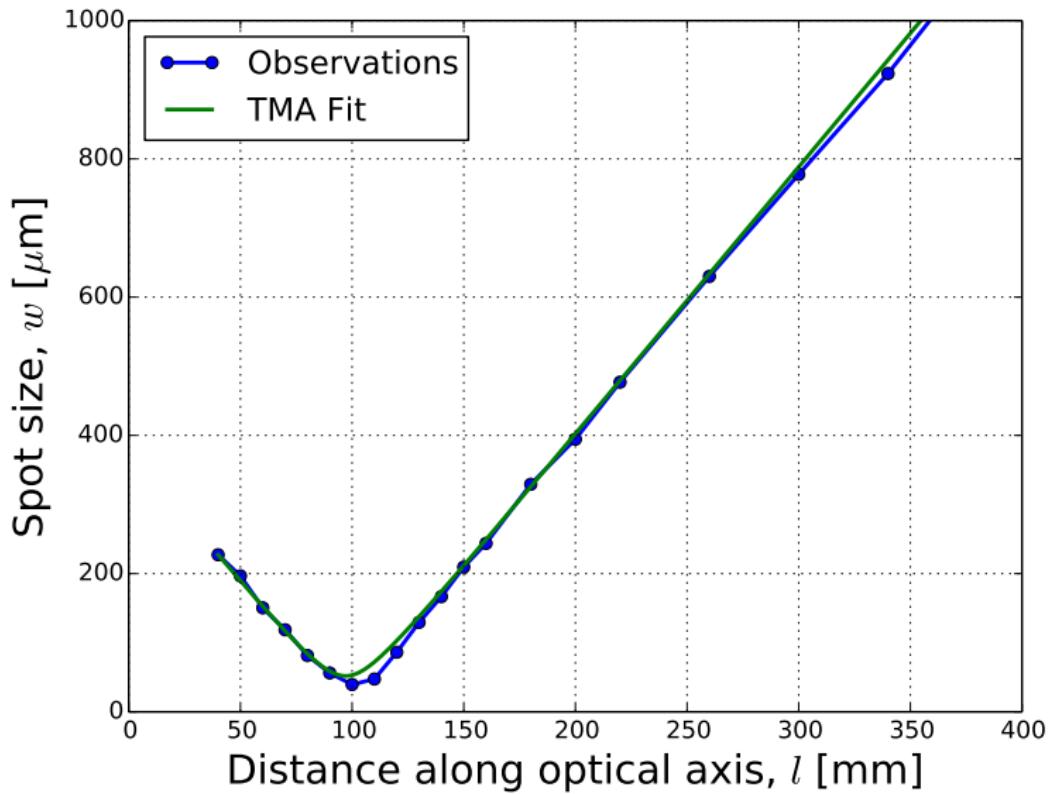
# Ser at profilen er tilnærmet gaussisk



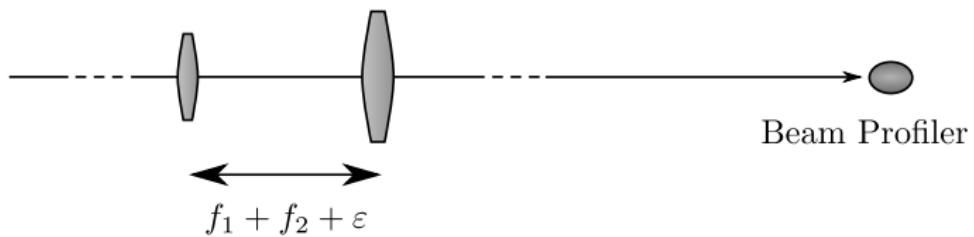
# Bruker TMA for å tilnærme krumningsradien



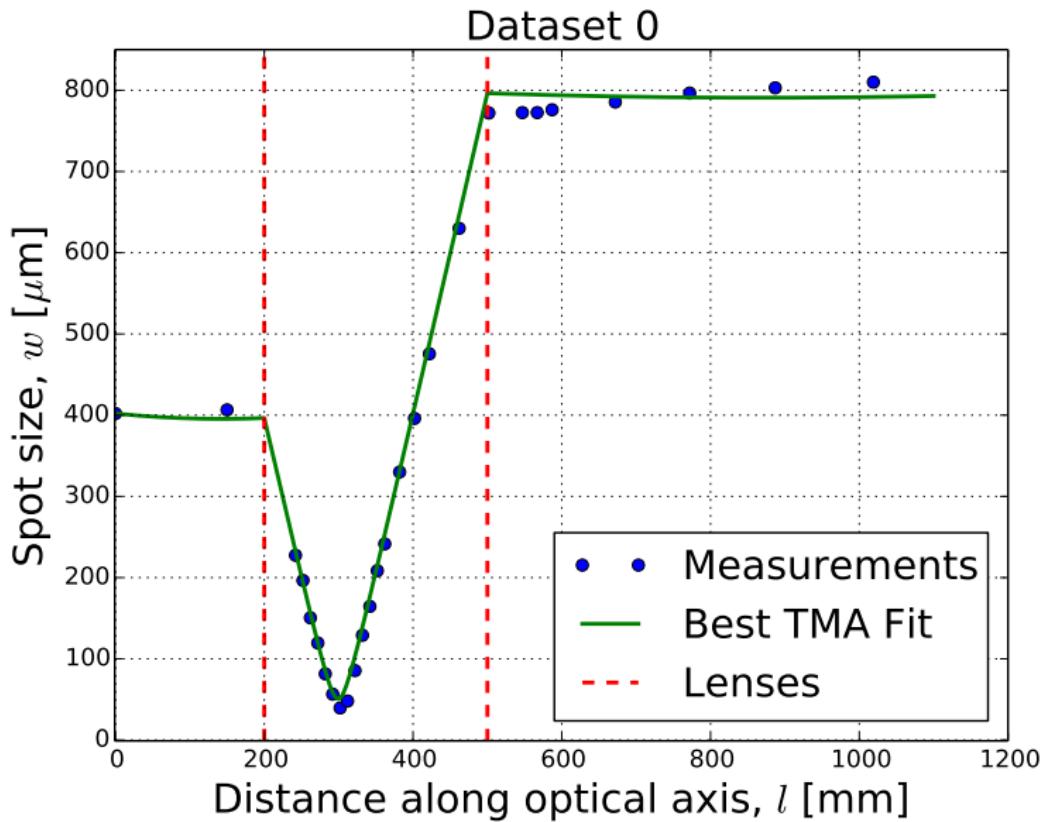
# Tester strålen i nærheten av midjen



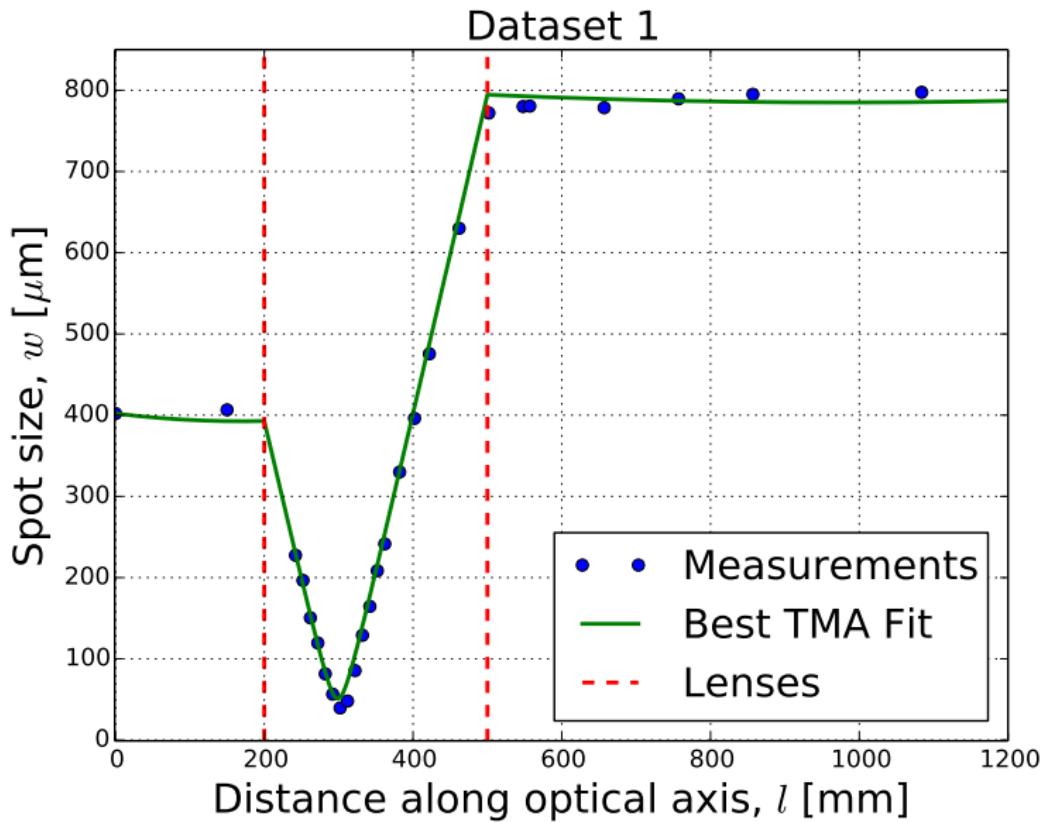
Lager en beam expander der avstanden småjusteres



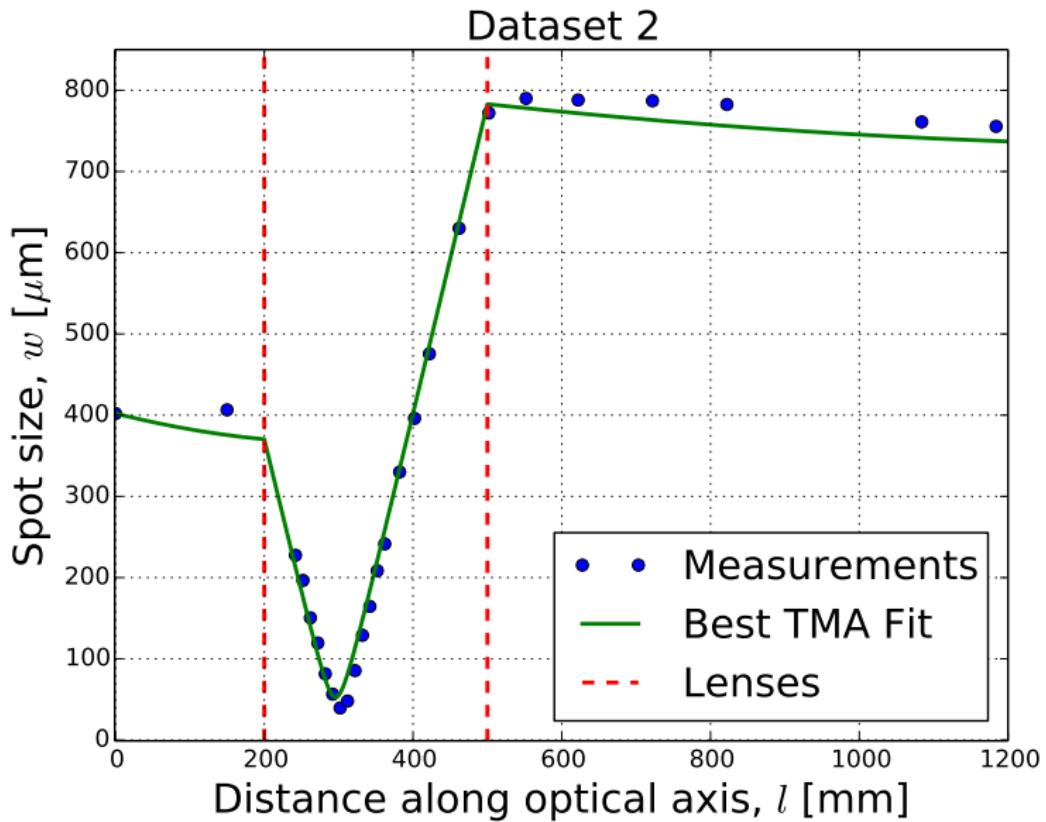
Avstanden har mye å si for den endelige krumningen



Avstanden har mye å si for den endelige krumningen



Avstanden har mye å si for den endelige krumningen



Skal sende strålen fra en laserpenn en lang avstand



$$d \approx 710 \text{ m}$$

Et teleskop brukes som beam expander



Strålen som starter bredt har lav divergensvinkel



Gaussiske stråler har gunstige egenskaper som gjør dem meget lette å regne på, og gjør dem gunstige i industri.

Strålegangen kan forutsies av TMA-metoden, men man må gjøre mange tilnærminger.

En stråle som skal holde konstant bredde må starte bredt, dette er fordi  $\theta \propto 1/w_0$ .