Difrakční experiment

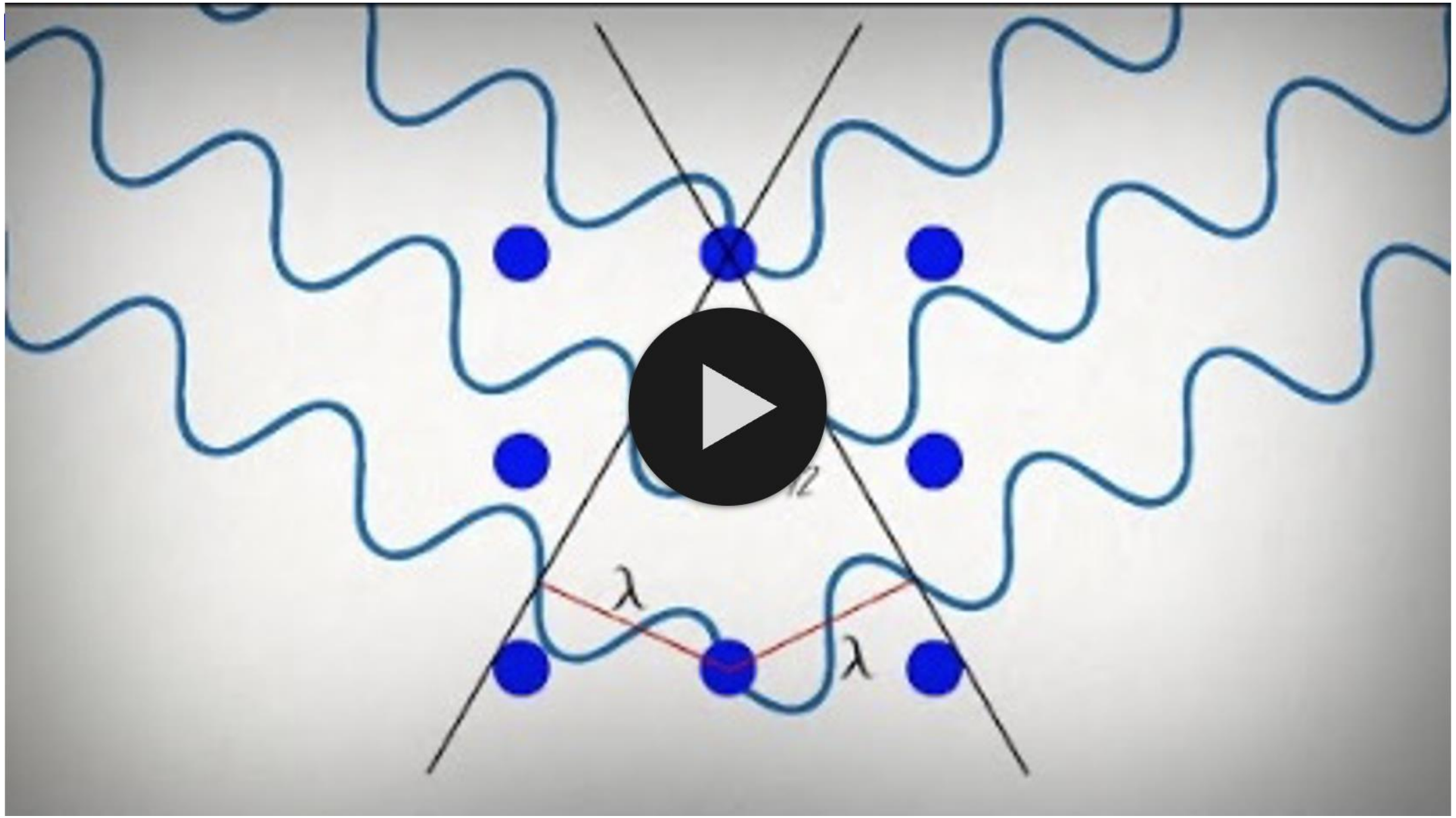
Rentgenová strukturní analýza

MUNI SCI National Centre for Biomolecular Research

Tom Brom

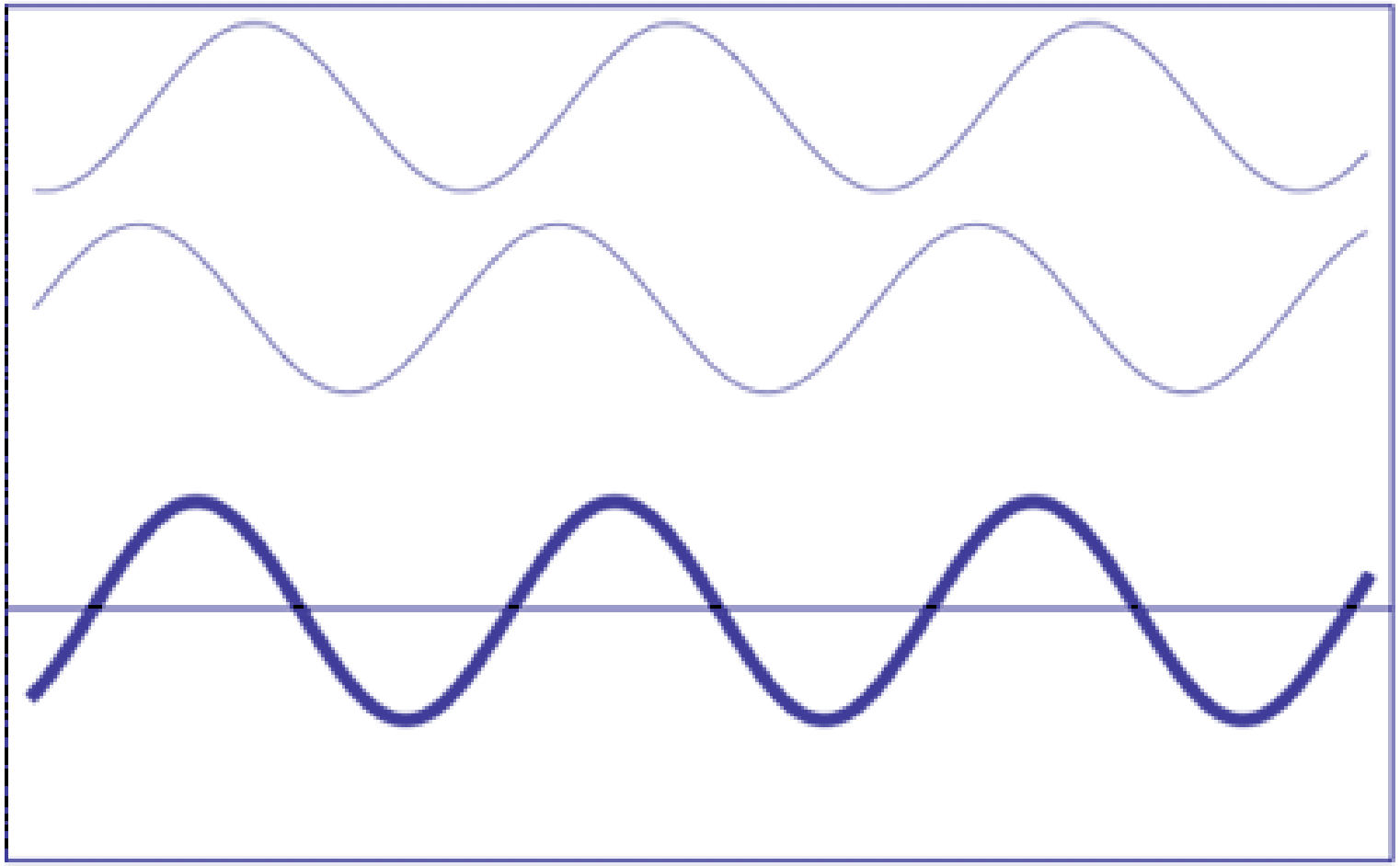
13. 11. 2024

Lifeb

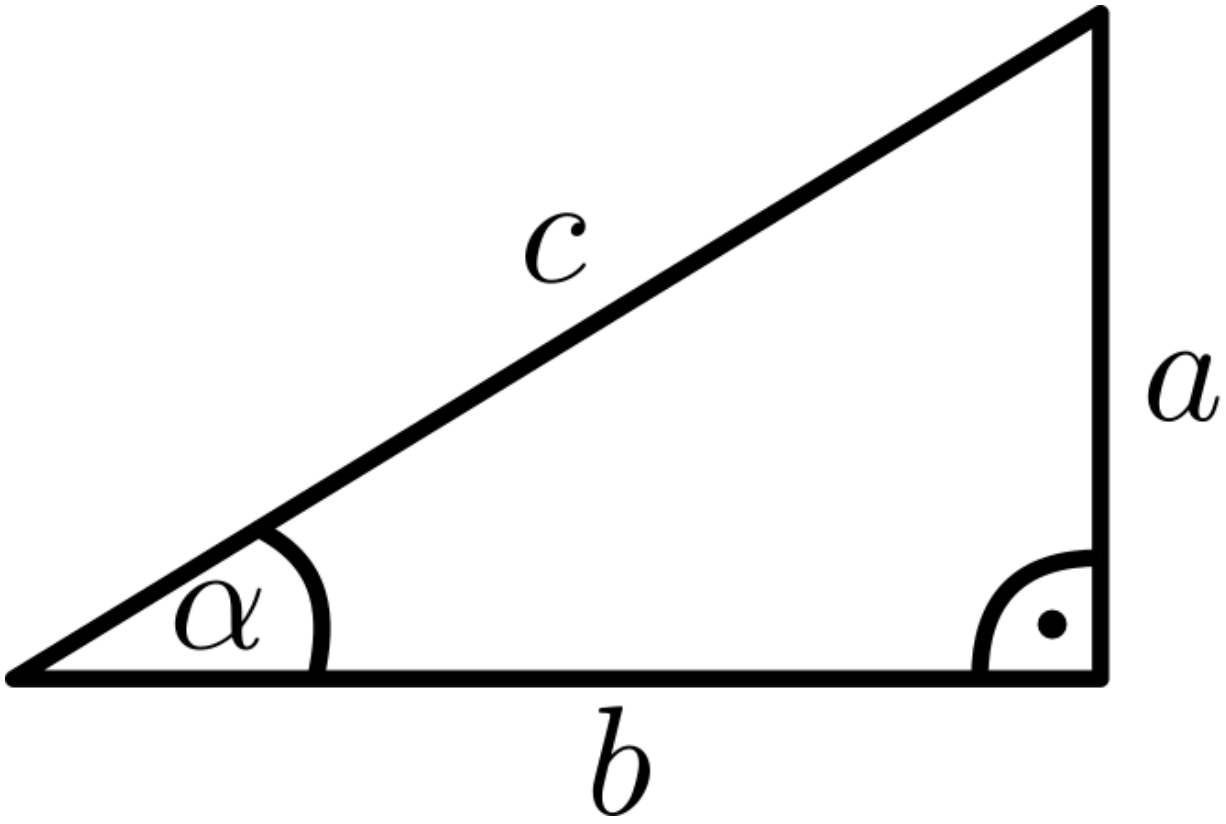


https://youtu.be/xBA09PXPPR4?si=VIyOm4sjZj6JqGIA

Opakování



Goniometrické funkce

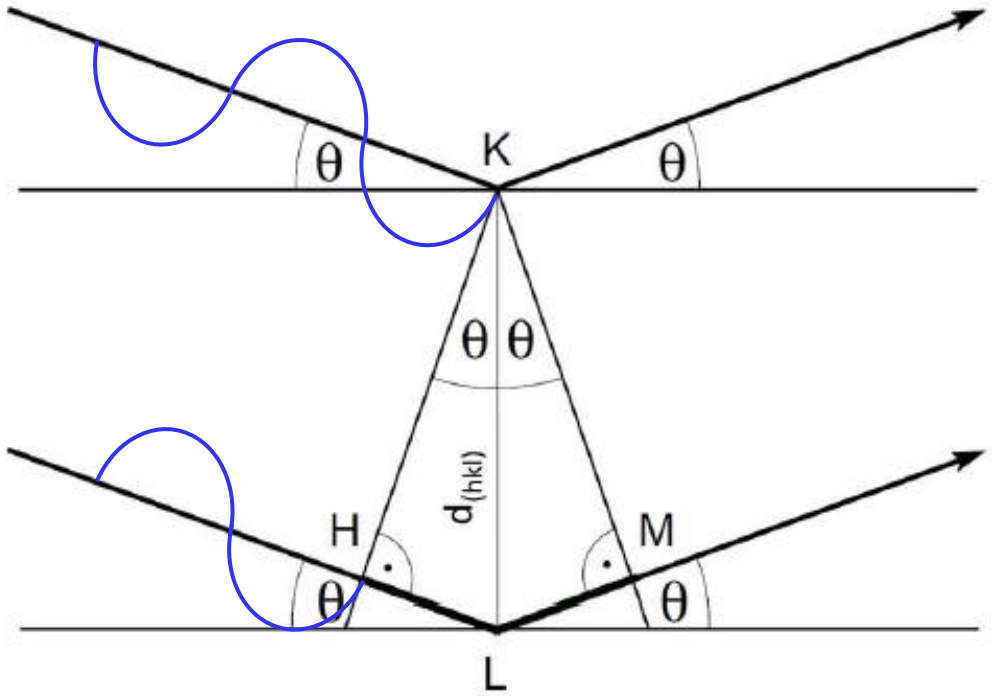


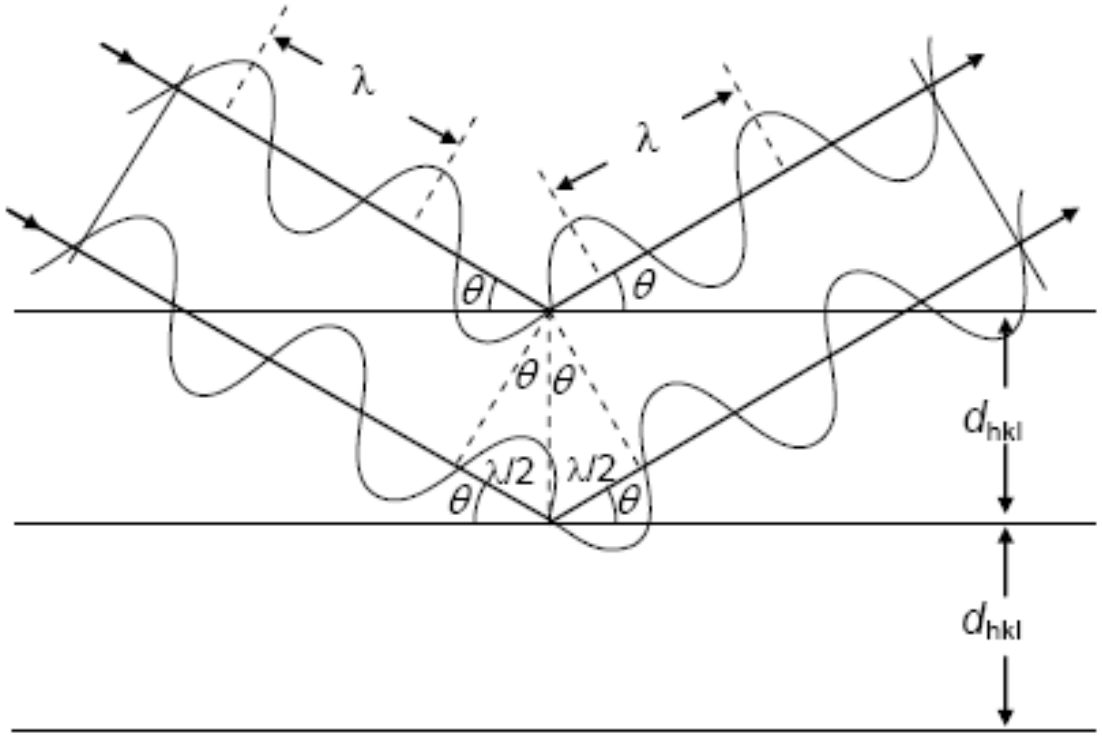
$$\sin(\alpha) = \frac{a}{c}$$

$$\cos(\alpha) = \frac{b}{c}$$

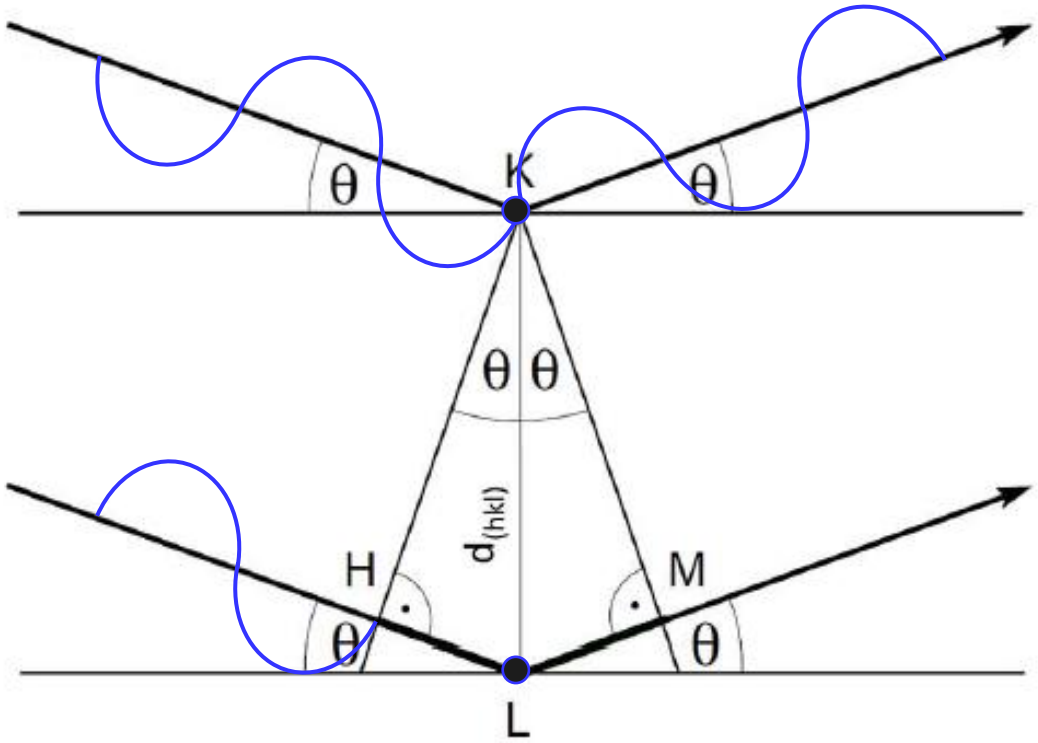
$$\tan(\alpha) = \frac{a}{b}$$

Braggův zákon





Braggův zákon



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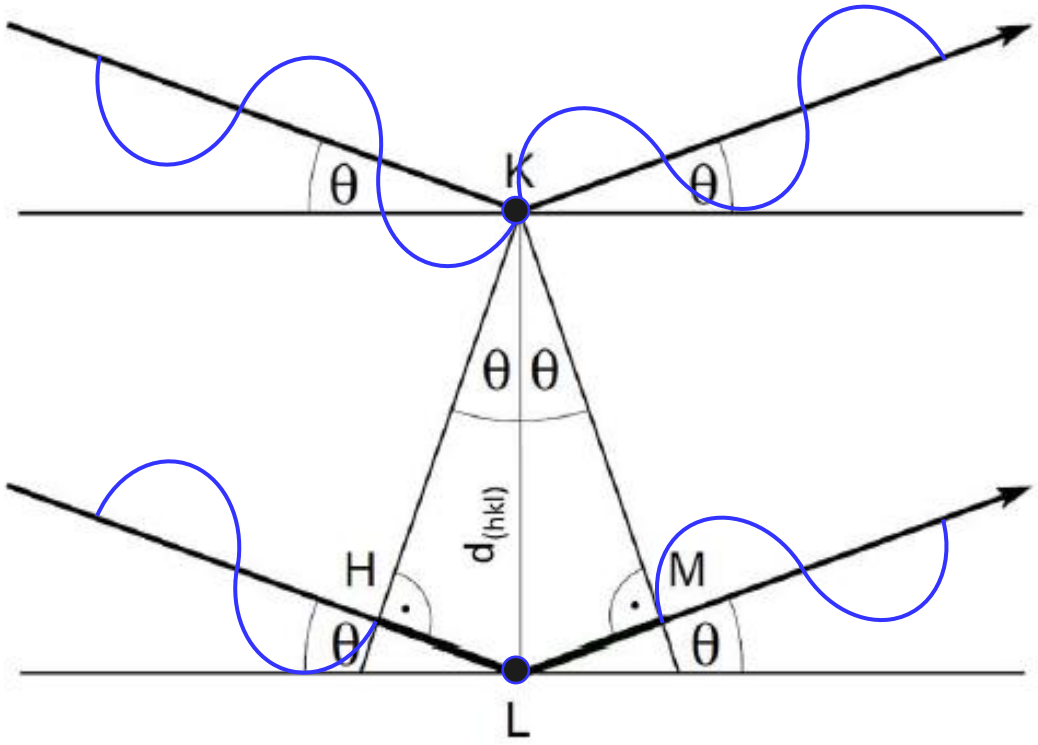
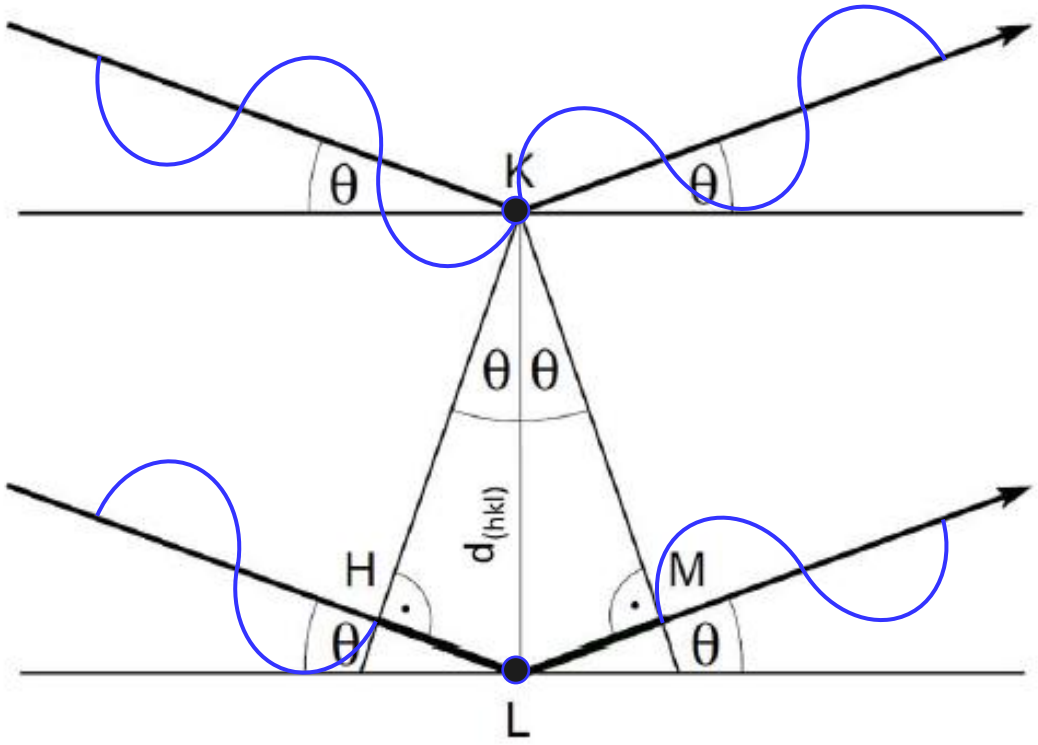


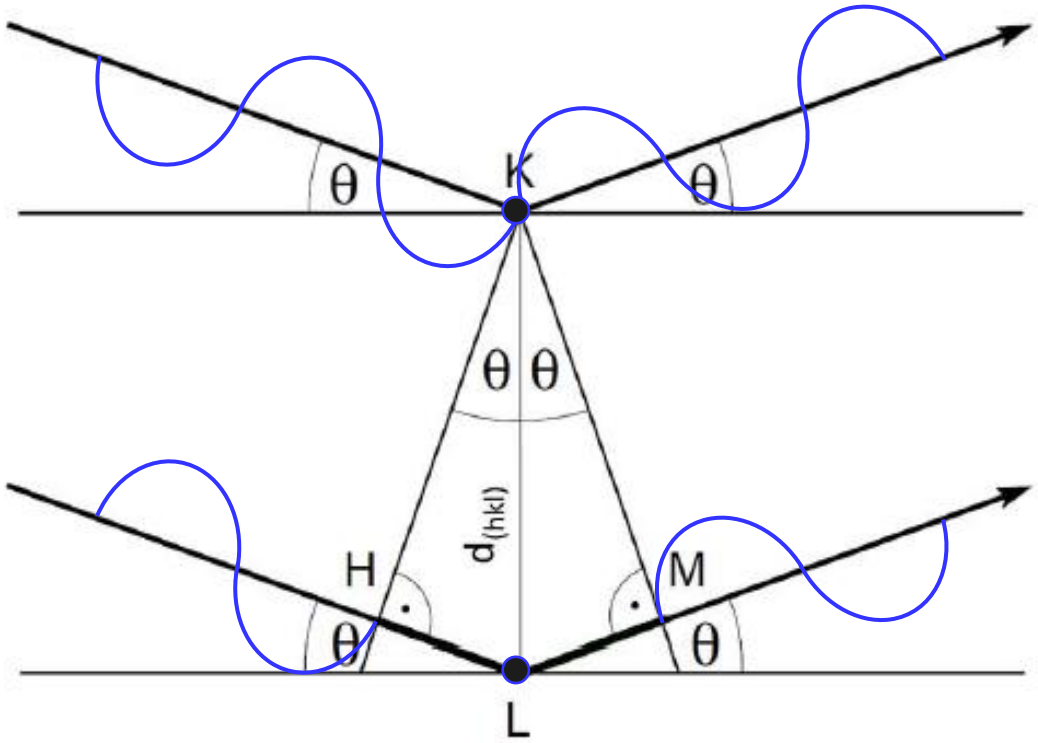
Braggův zákon



Extra vzdálenost

HL + LM = $n\lambda$

Braggův zákon

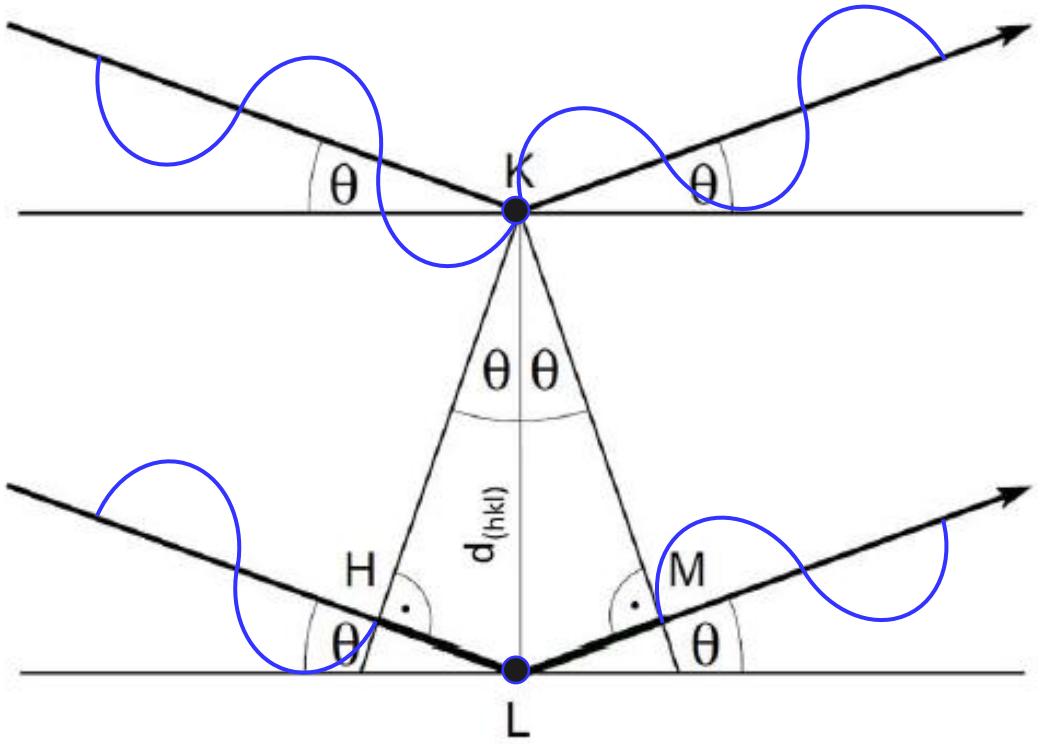


HL + LM = $n\lambda$

$\sin\theta$ = HL/d

$\sin\theta$ = LM/d

Braggův zákon

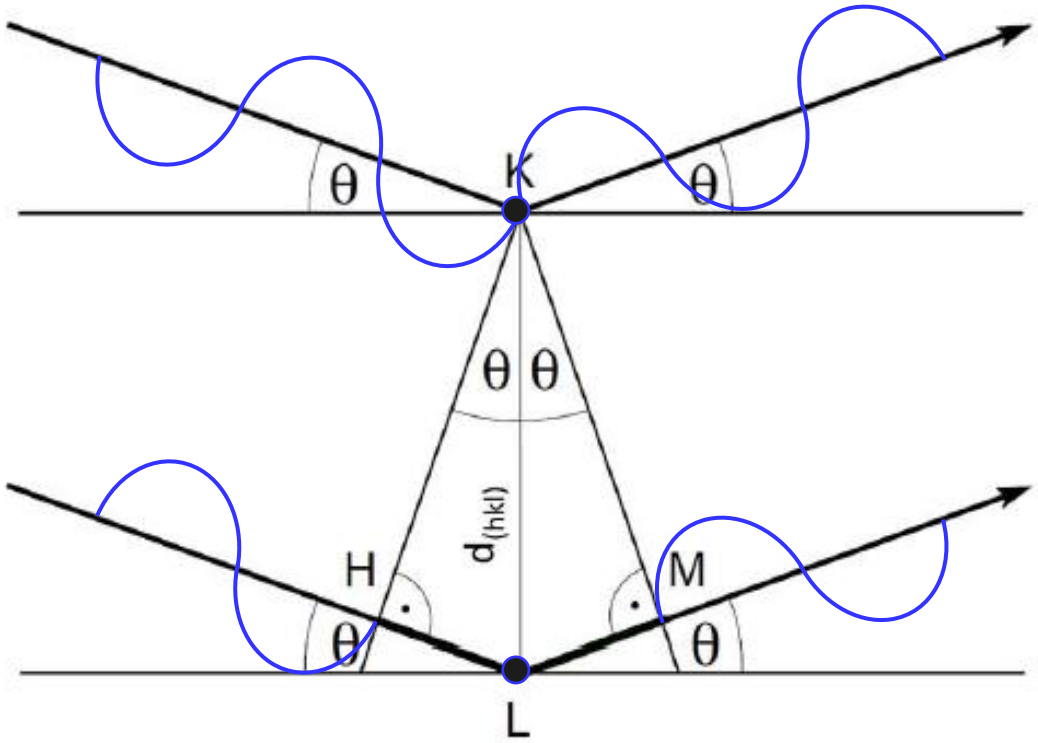


HL + LM = $n\lambda$

$\sin\theta$ = HL/d
d*$\sin\theta$ = HL

$\sin\theta$ = LM/d
d*$\sin\theta$ = LM

Braggův zákon



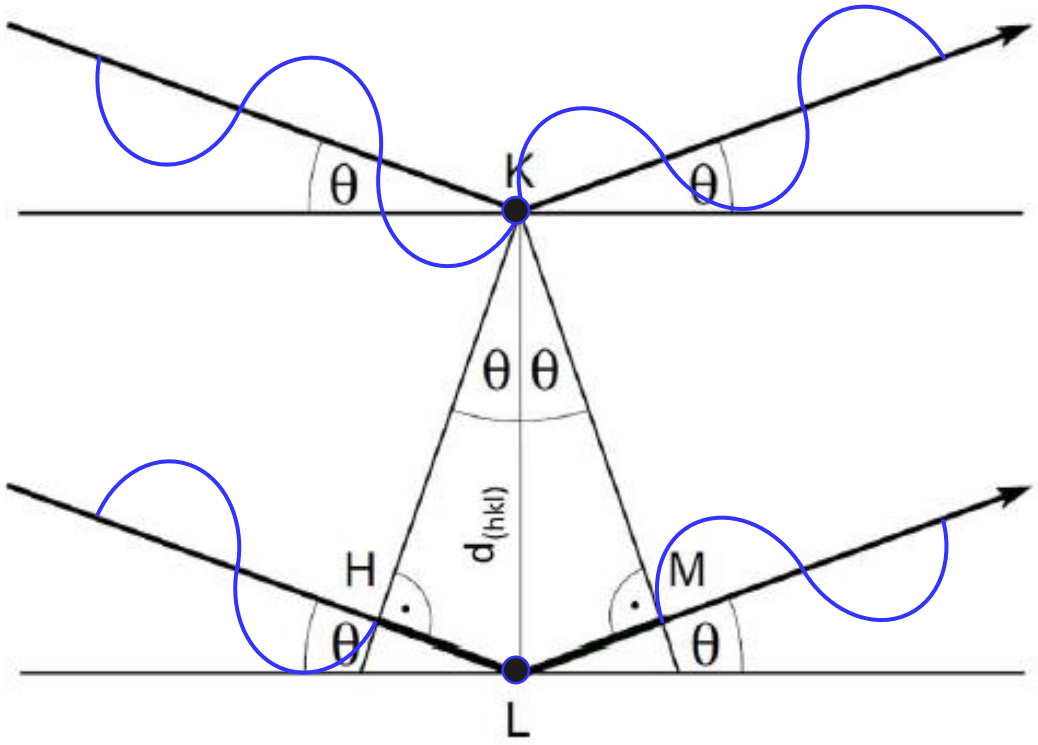
HL + LM = $n\lambda$

$\sin\theta$ = HL/d
d*$\sin\theta$ = HL

$\sin\theta$ = LM/d
d*$\sin\theta$ = LM

HL + LM = $n\lambda$
d*$\sin\theta$ + d*$\sin\theta$ = $n\lambda$

Braggův zákon



HL + LM = $n\lambda$

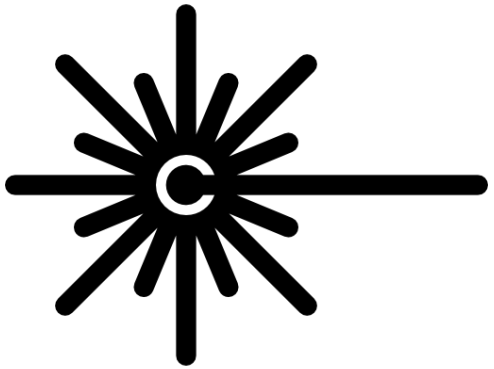
$\sin\theta$ = HL/d
d*$\sin\theta$ = HL

$\sin\theta$ = LM/d
d*$\sin\theta$ = LM

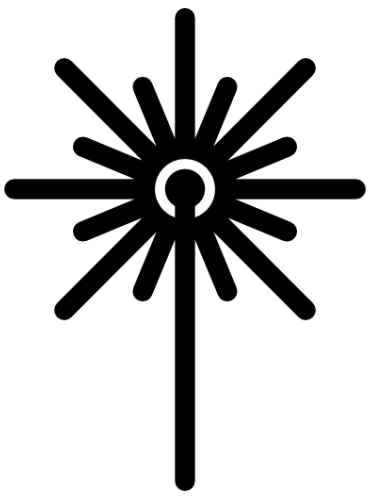
HL + LM = $n\lambda$
d*$\sin\theta$ + d*$\sin\theta$ = $n\lambda$

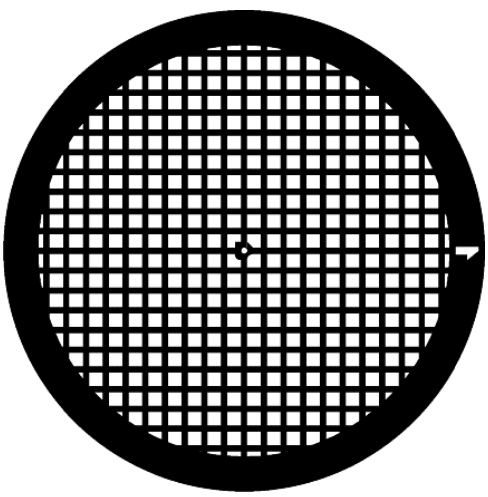
$$\mathbf{2d}\,\boldsymbol{\sin\theta} = \boldsymbol{n\lambda}$$

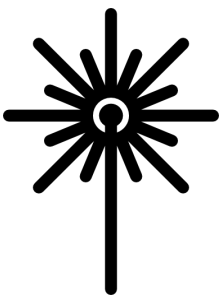
Rozptyl světla na mřížce

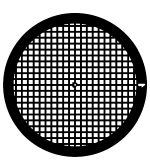


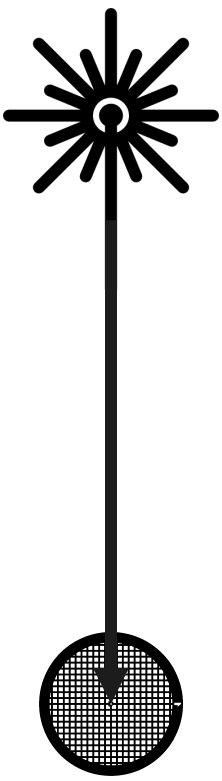
C9531 - Rentgenová Krystalografie

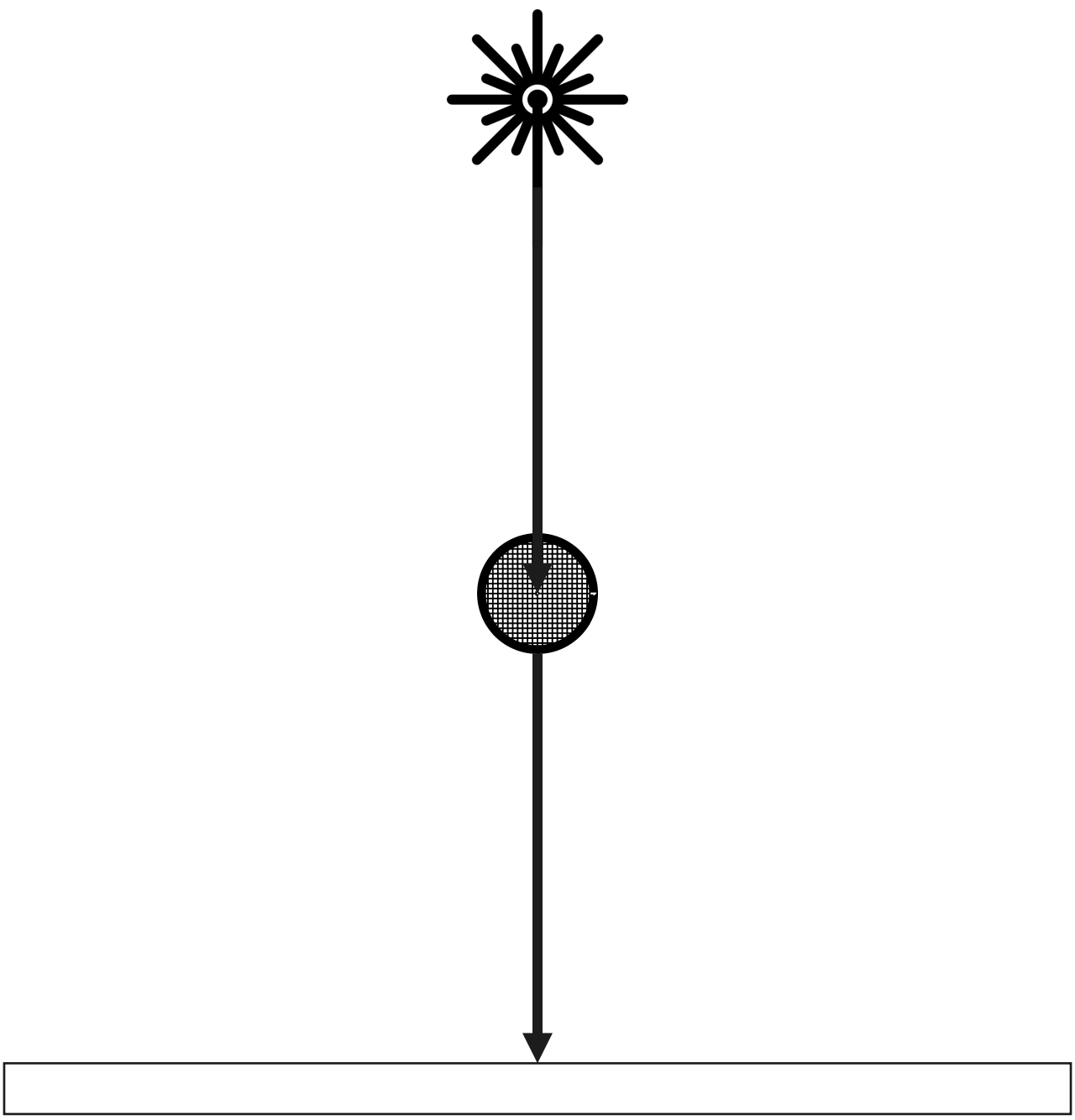


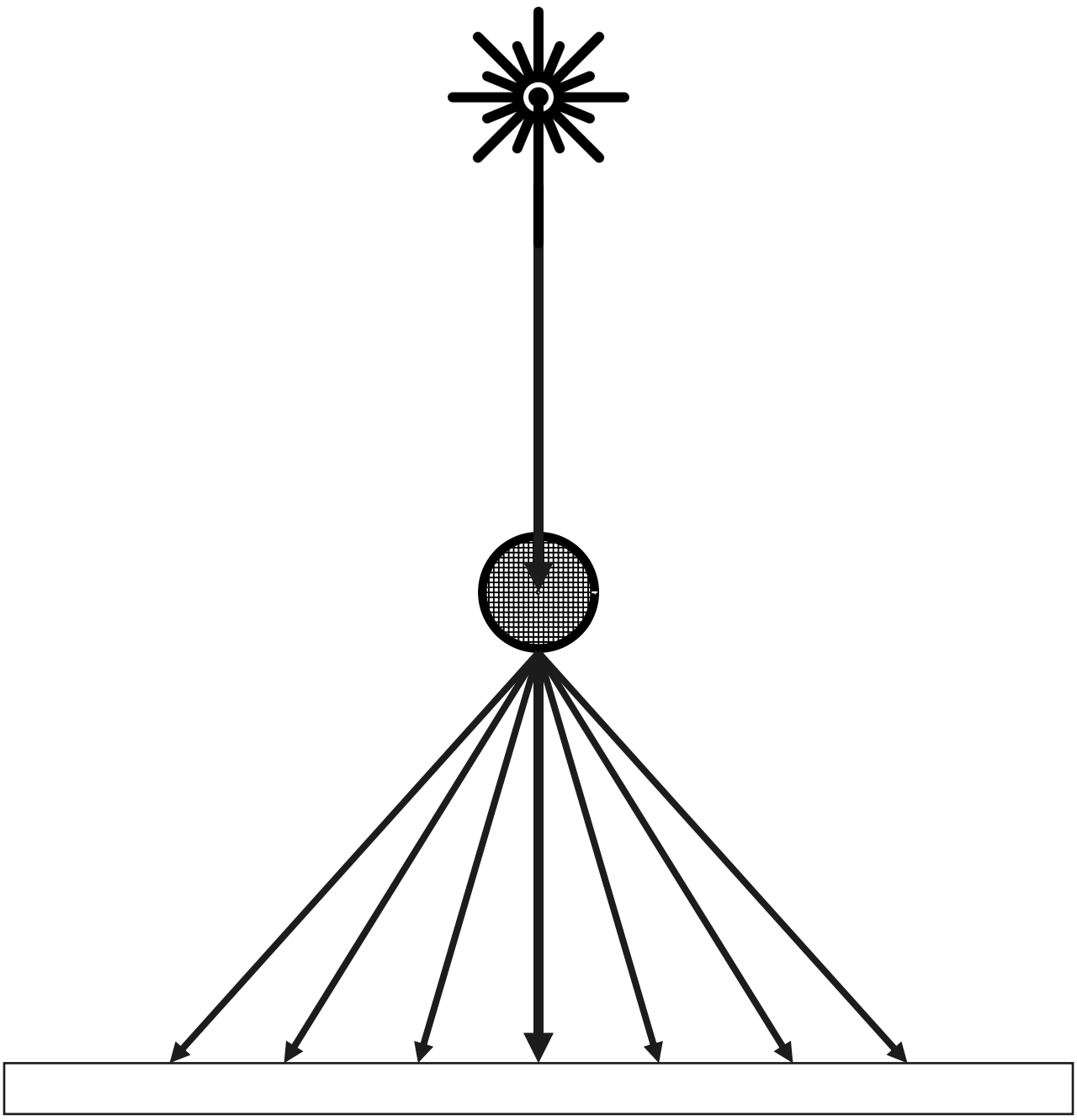


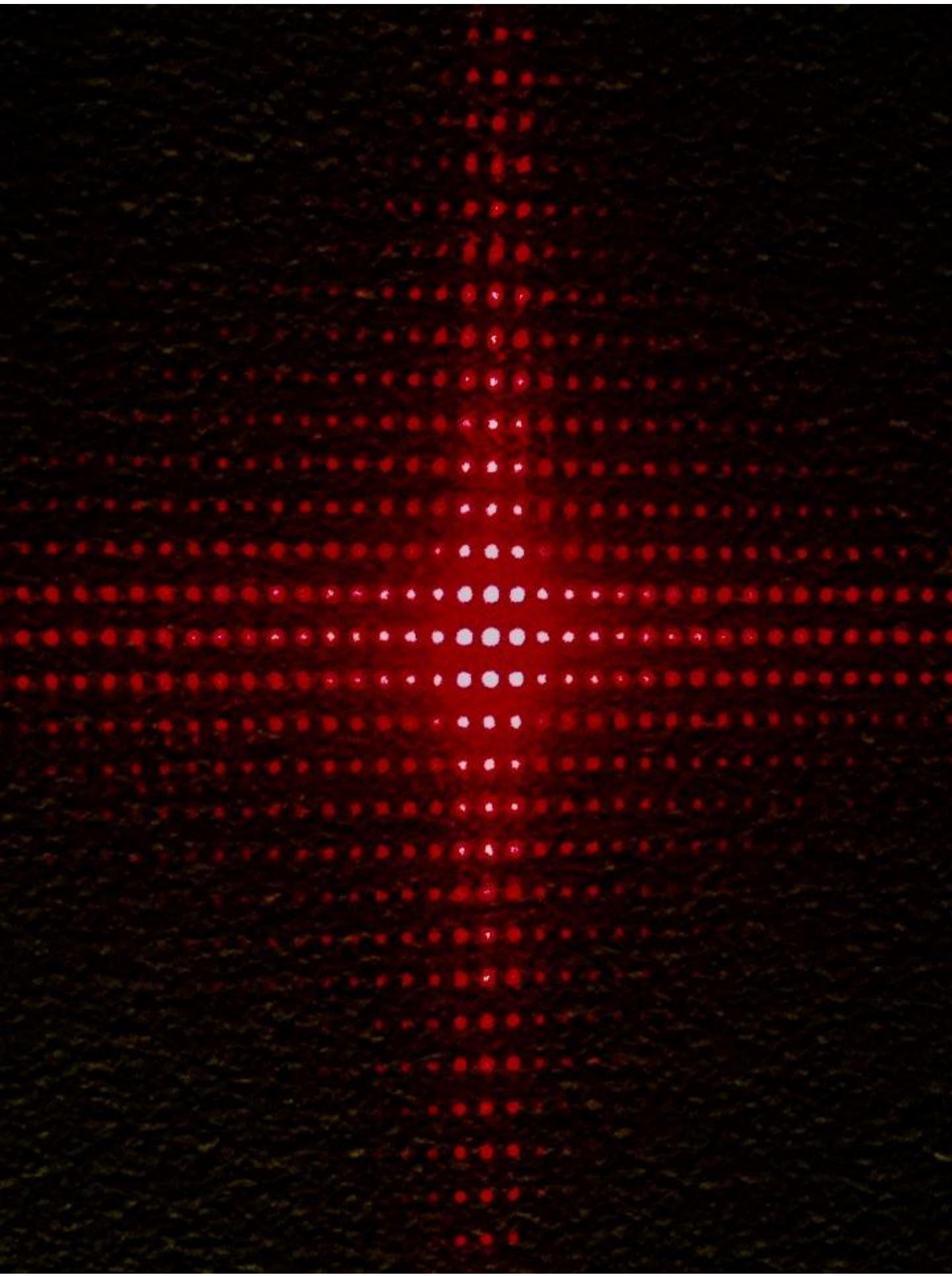






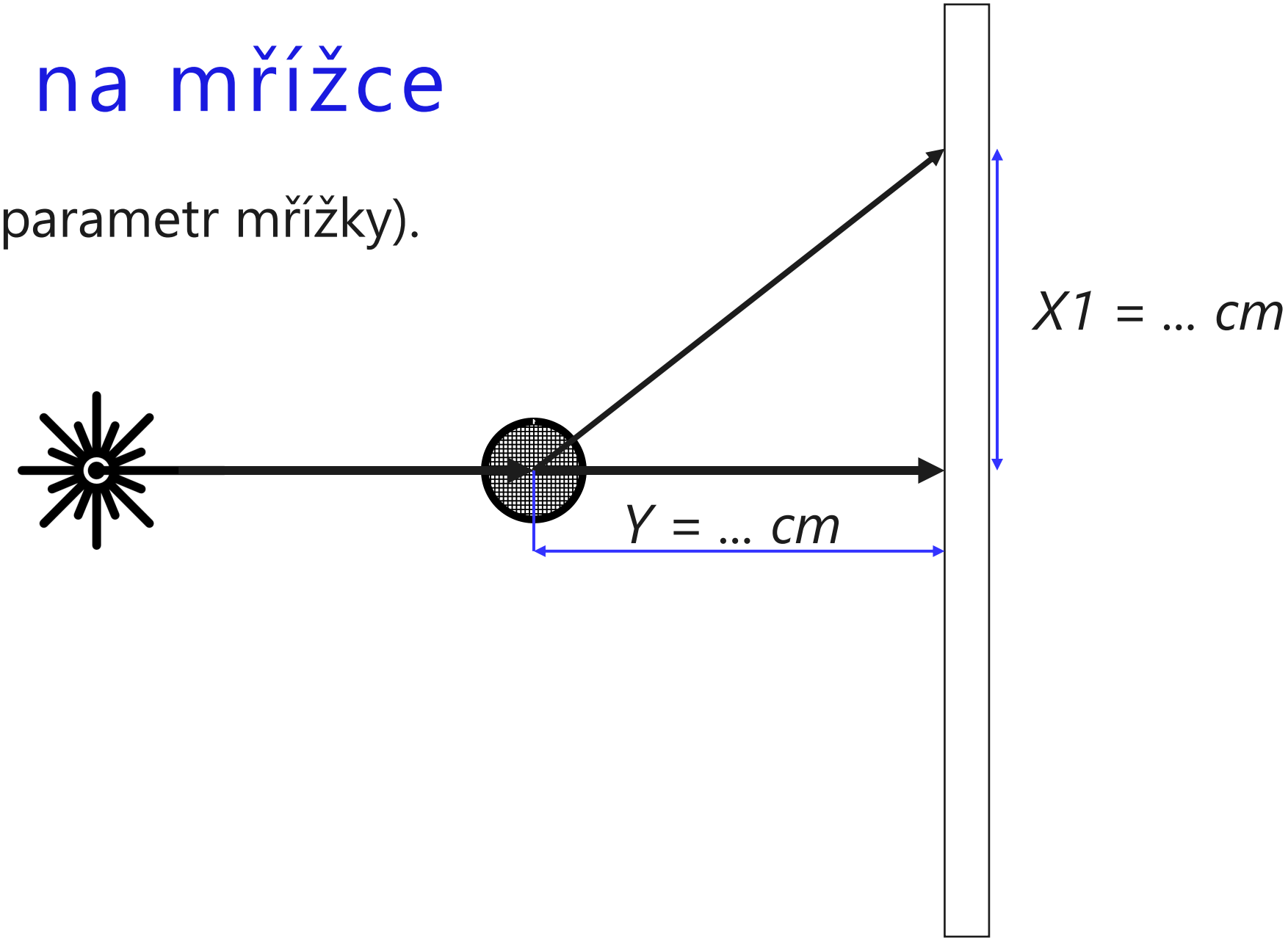






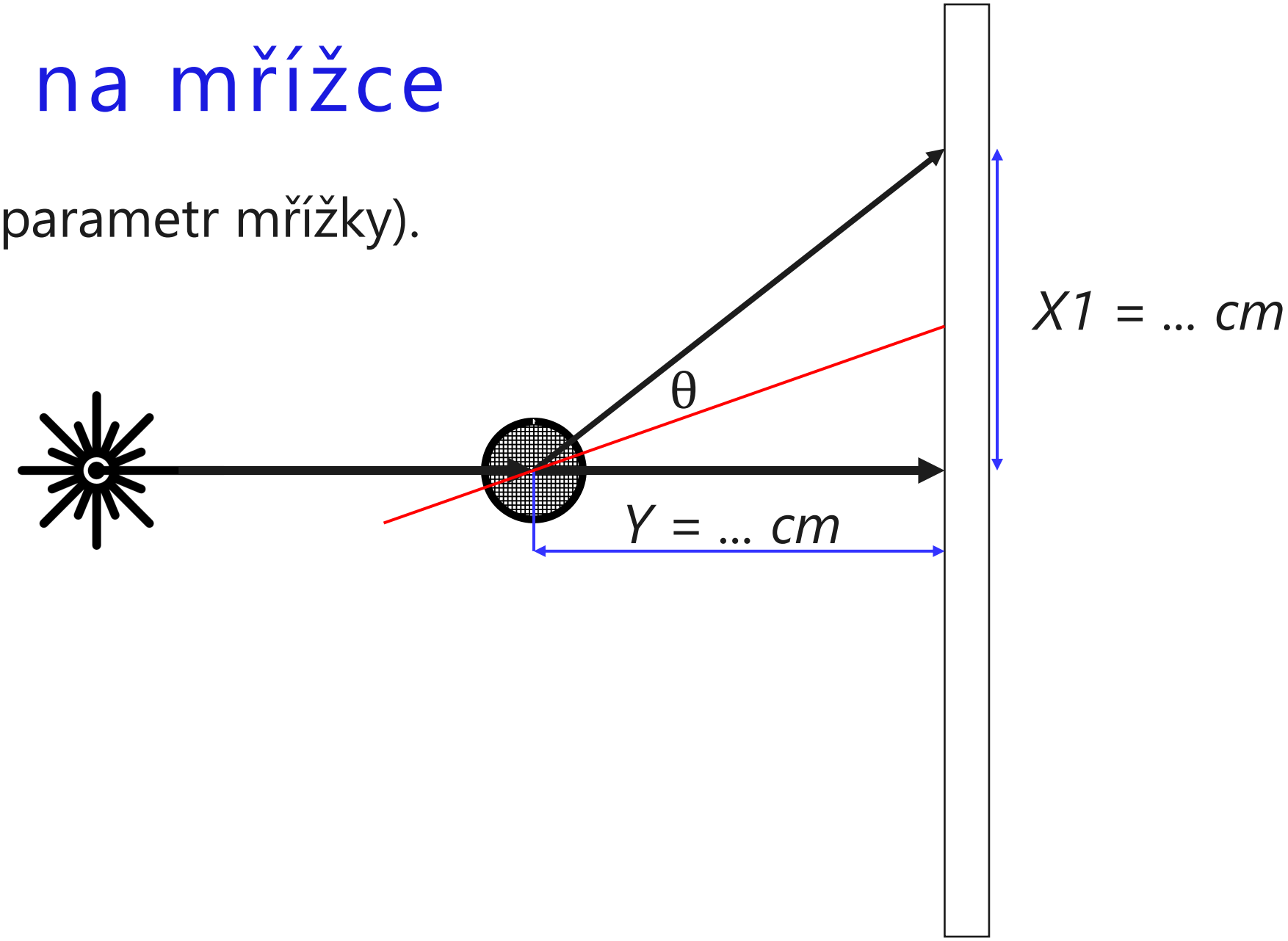
Difrakce na mřížce

Vypočítejte **d** (parametr mřížky).



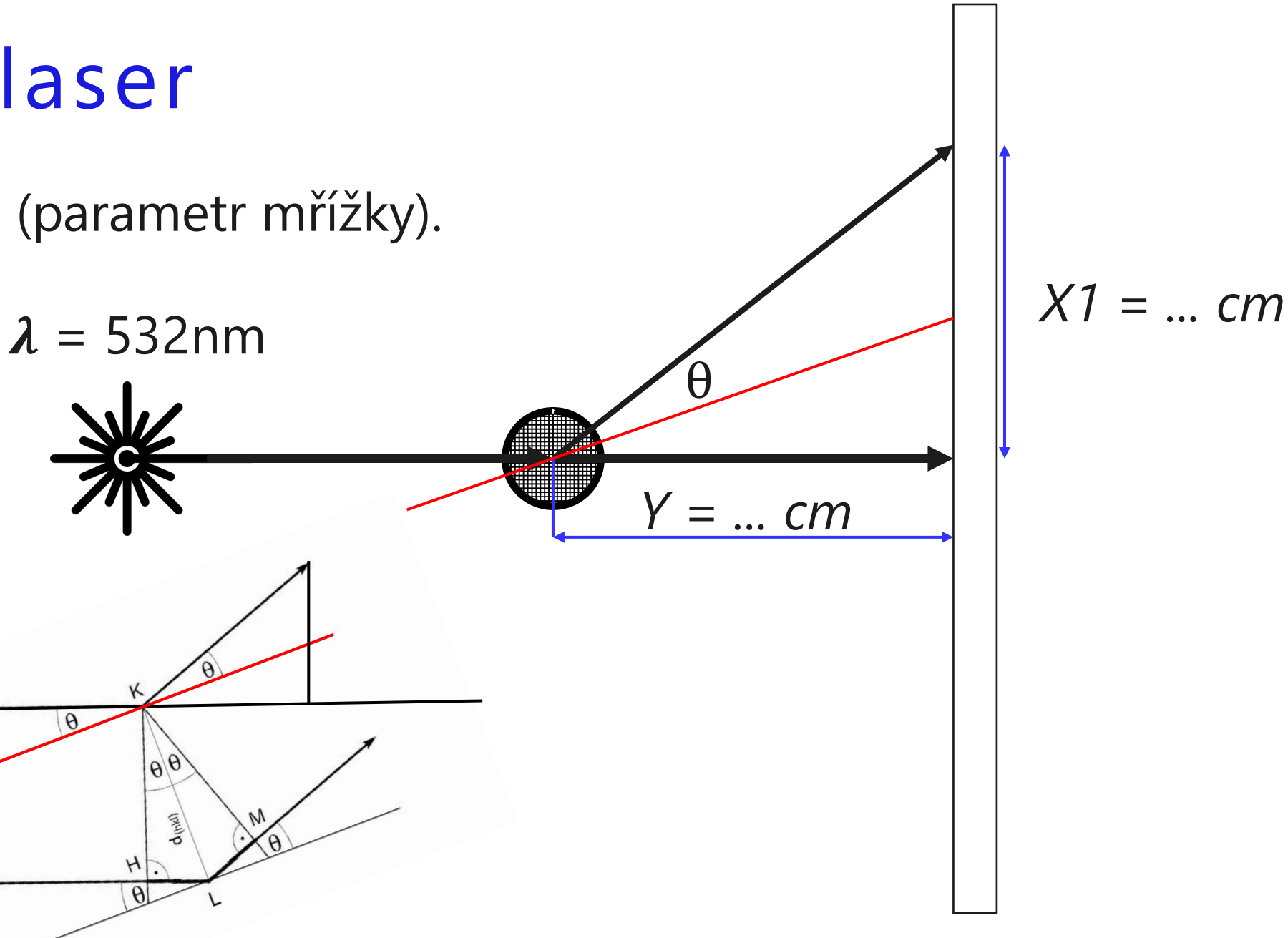
Difrakce na mřížce

Vypočítejte **d** (parametr mřížky).



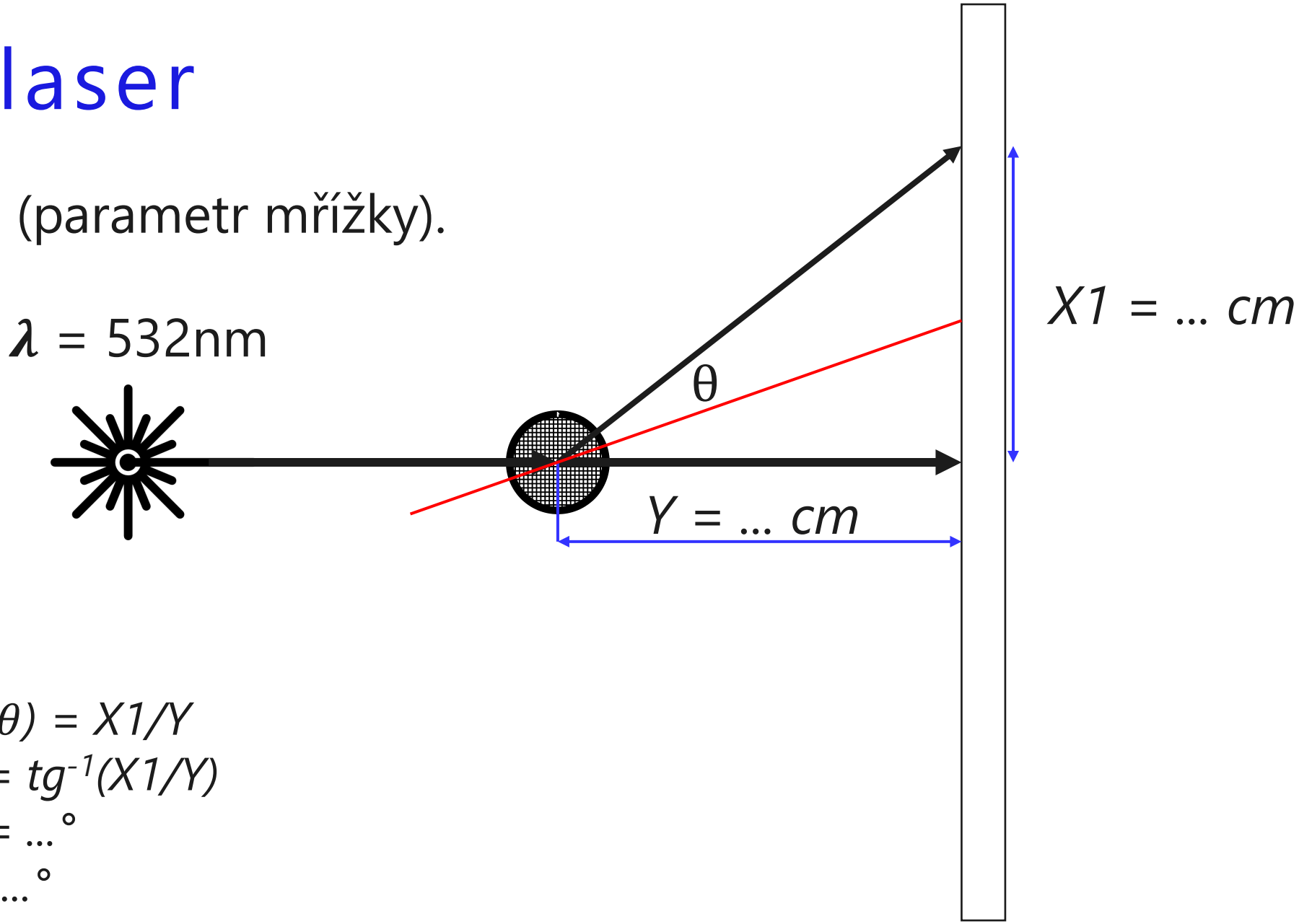
Zelený laser

Vypočítejte **d** (parametr mřížky).



Zelený laser

Vypočítejte **d** (parametr mřížky).



$tg(2\theta) = X1/Y$

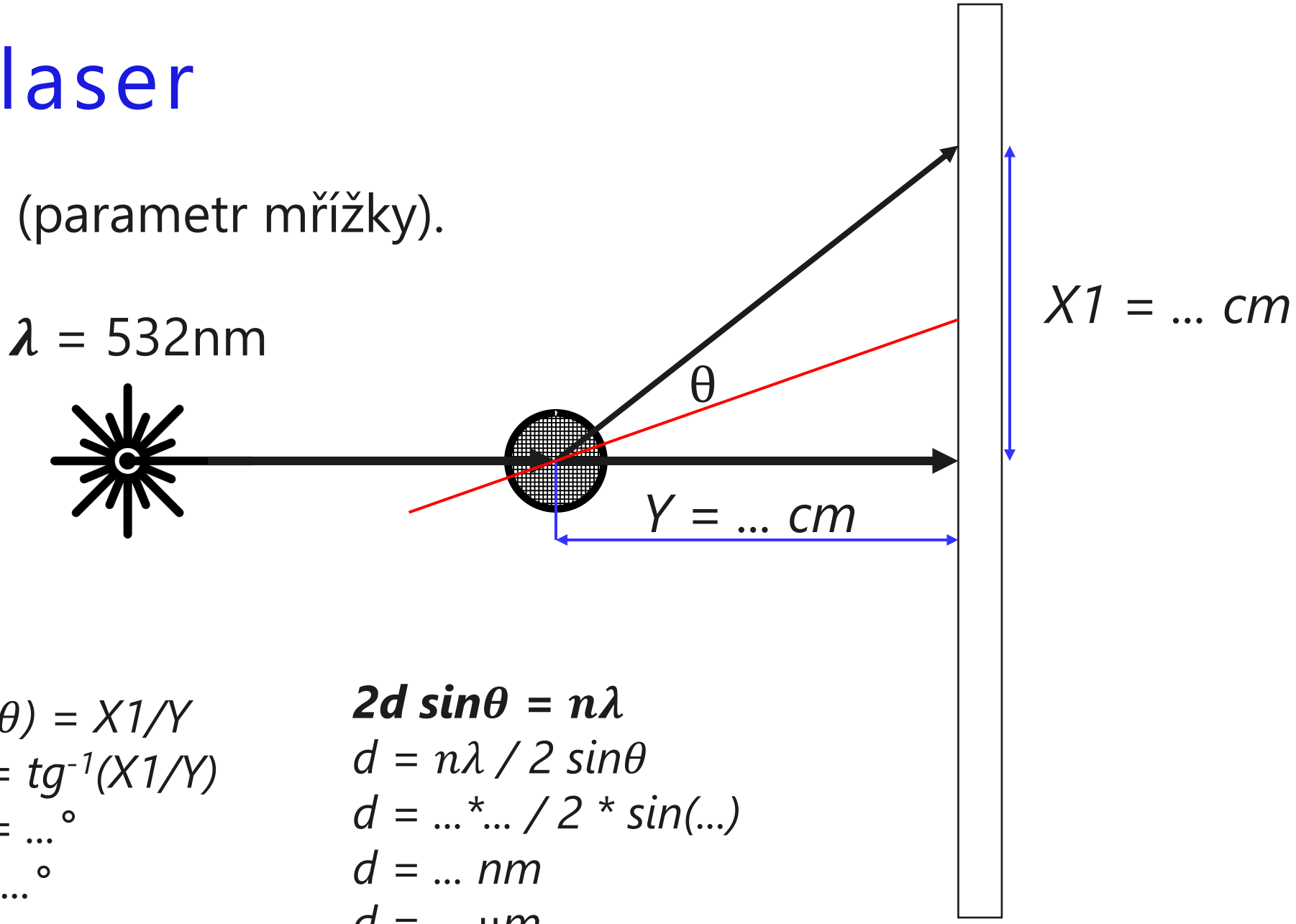
$2\theta = tg^{-1}(X1/Y)$

$2\theta = \ldots°$

$\theta = \ldots°$

Zelený laser

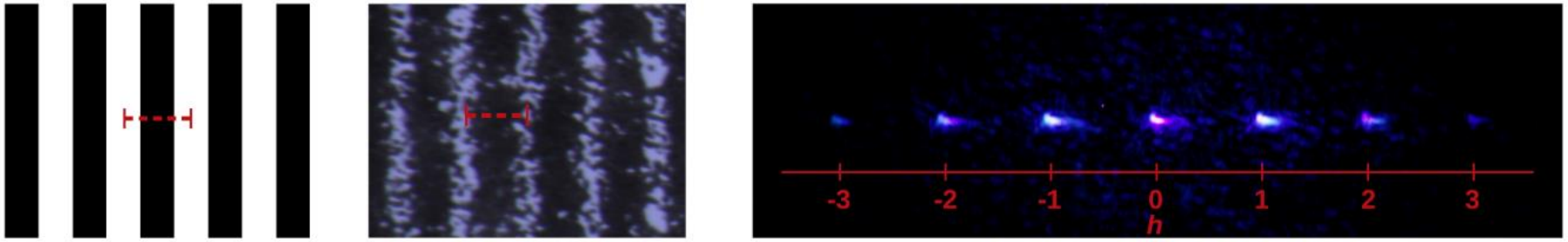
Vypočítejte **d** (parametr mřížky).



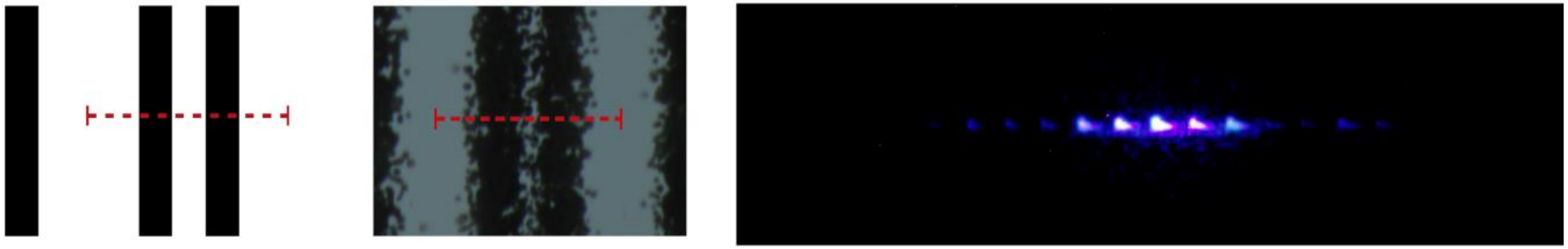
$tg(2\theta) = X1/Y$
$2\theta = tg^{-1}(X1/Y)$
$2\theta = \ldots°$
$\theta = \ldots°$

$\boldsymbol{2d \sin\theta = n\lambda}$
$d = n\lambda / 2 \sin\theta$
$d = \ldots * \ldots / 2 * \sin(\ldots)$
$d = \ldots\ nm$
$d = \ldots\ \mu m$

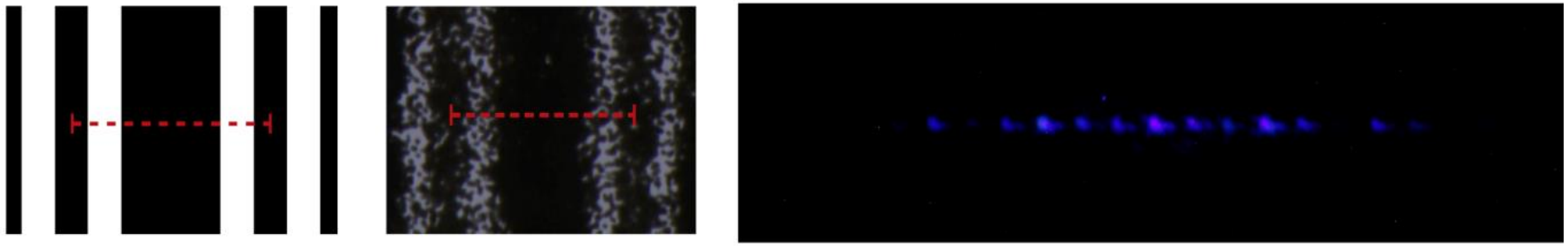
A)

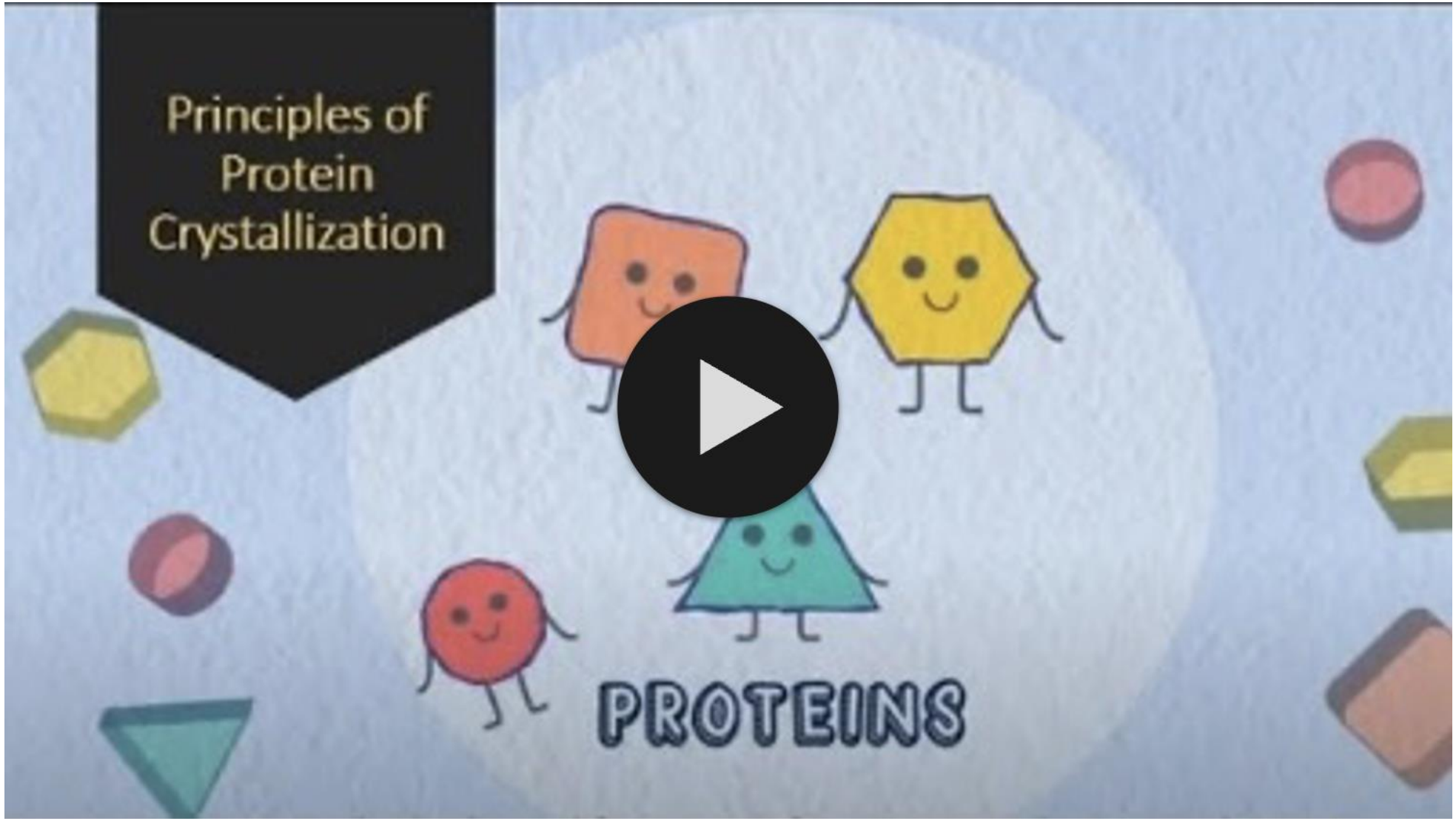


B)

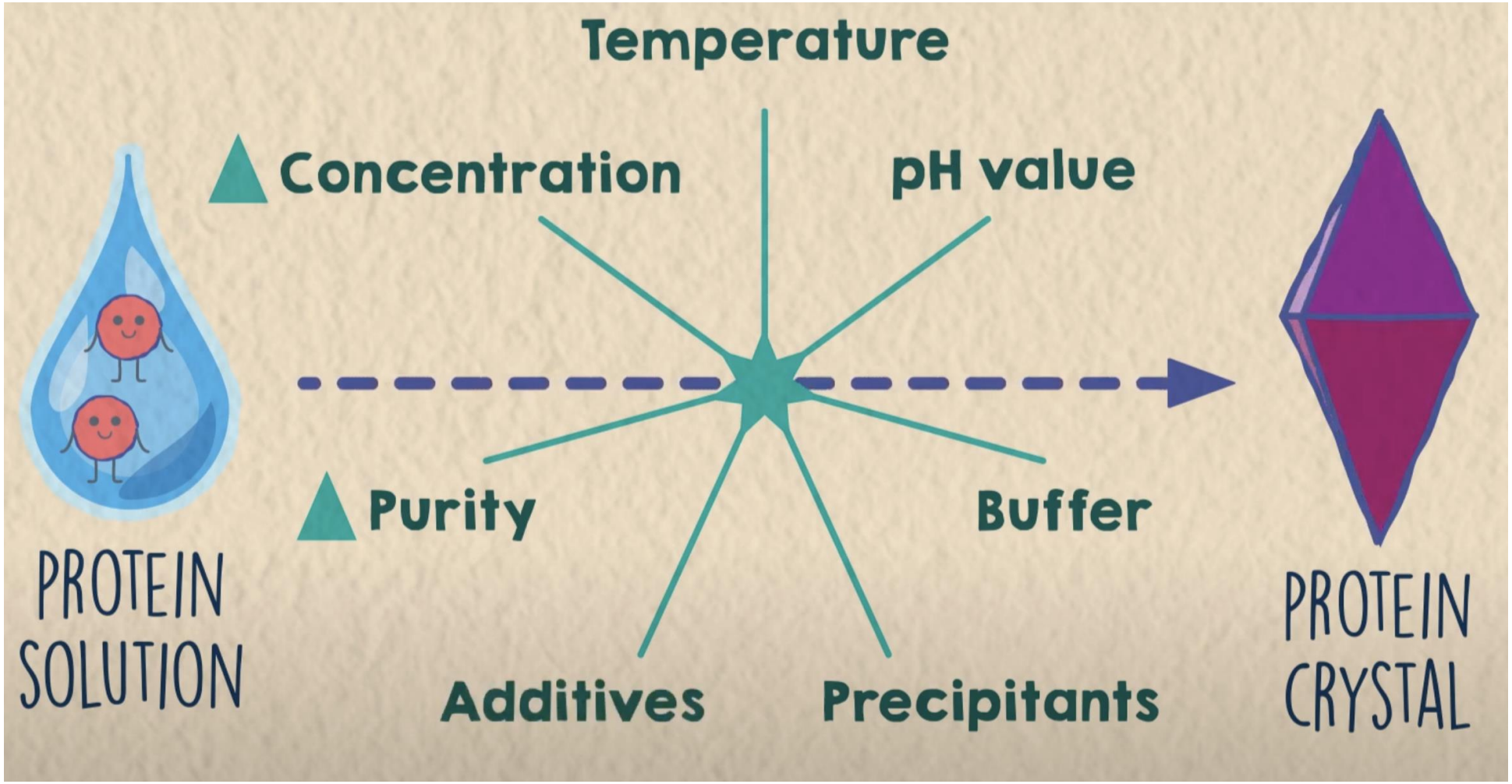


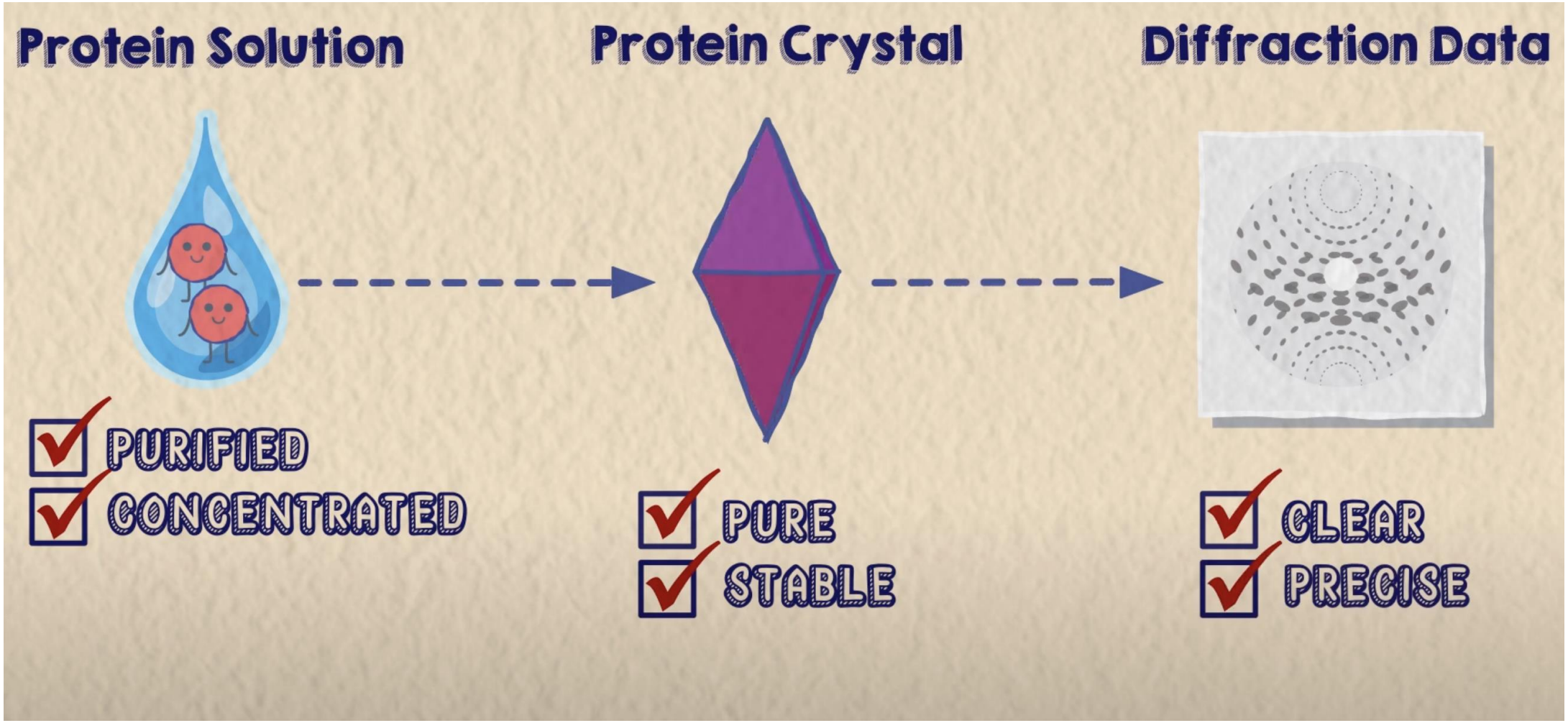
C)

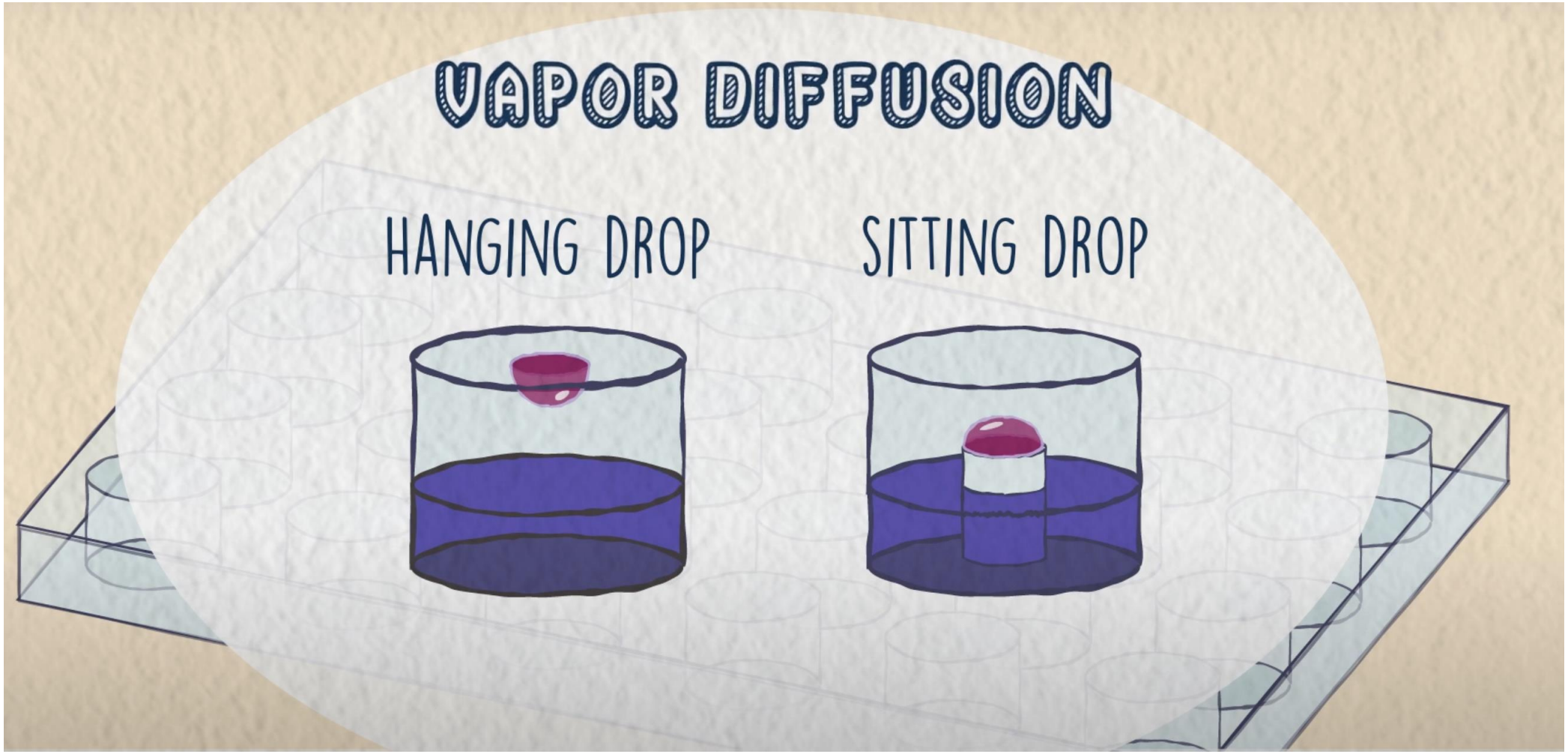


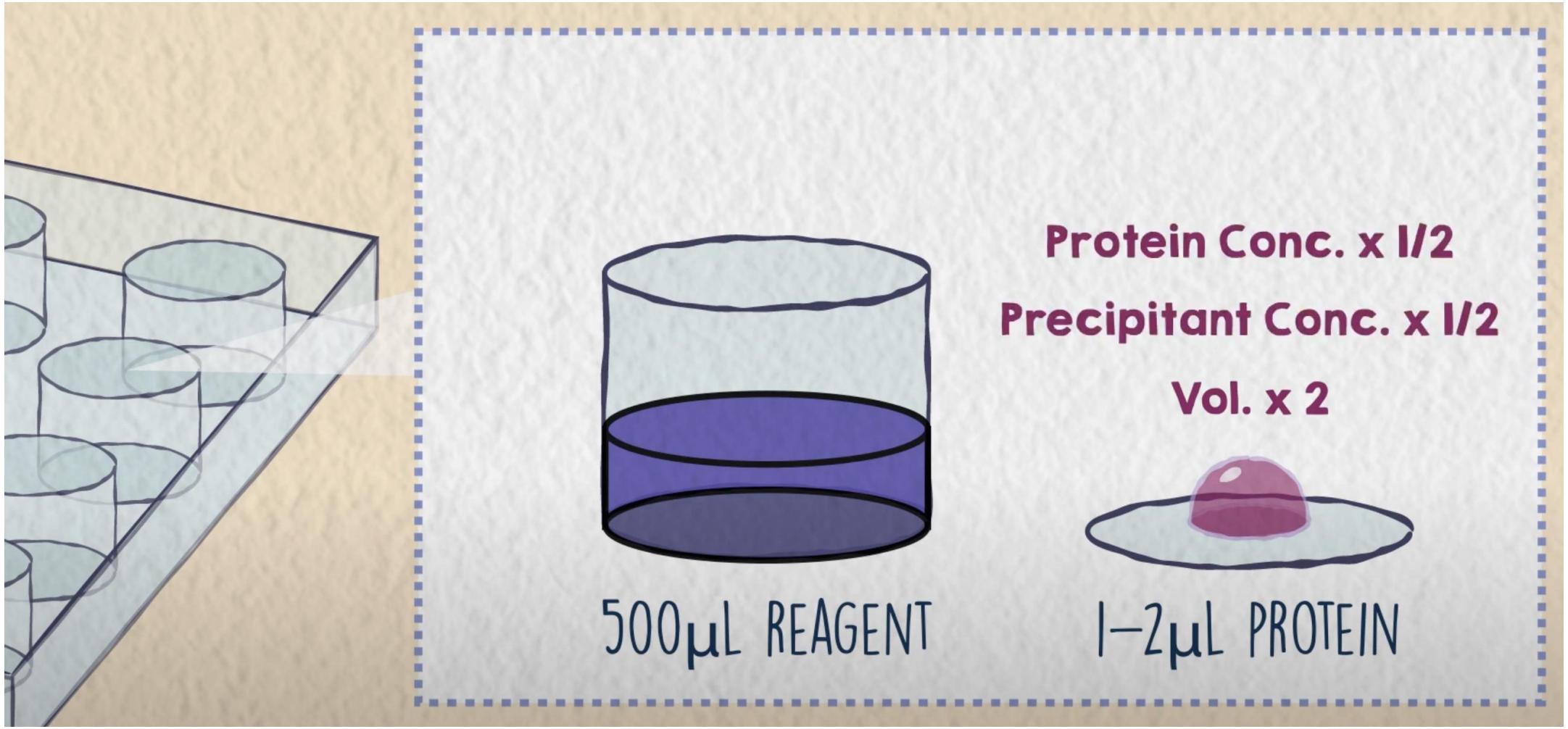


Real video: https://youtu.be/kPX6-Ab1pYw?si=dFBcu3qhfE-17EdU


Temperature
Concentration
pH value
Purity
Buffer
Additives
Precipitants
PROTEIN SOLUTION
PROTEIN CRYSTAL

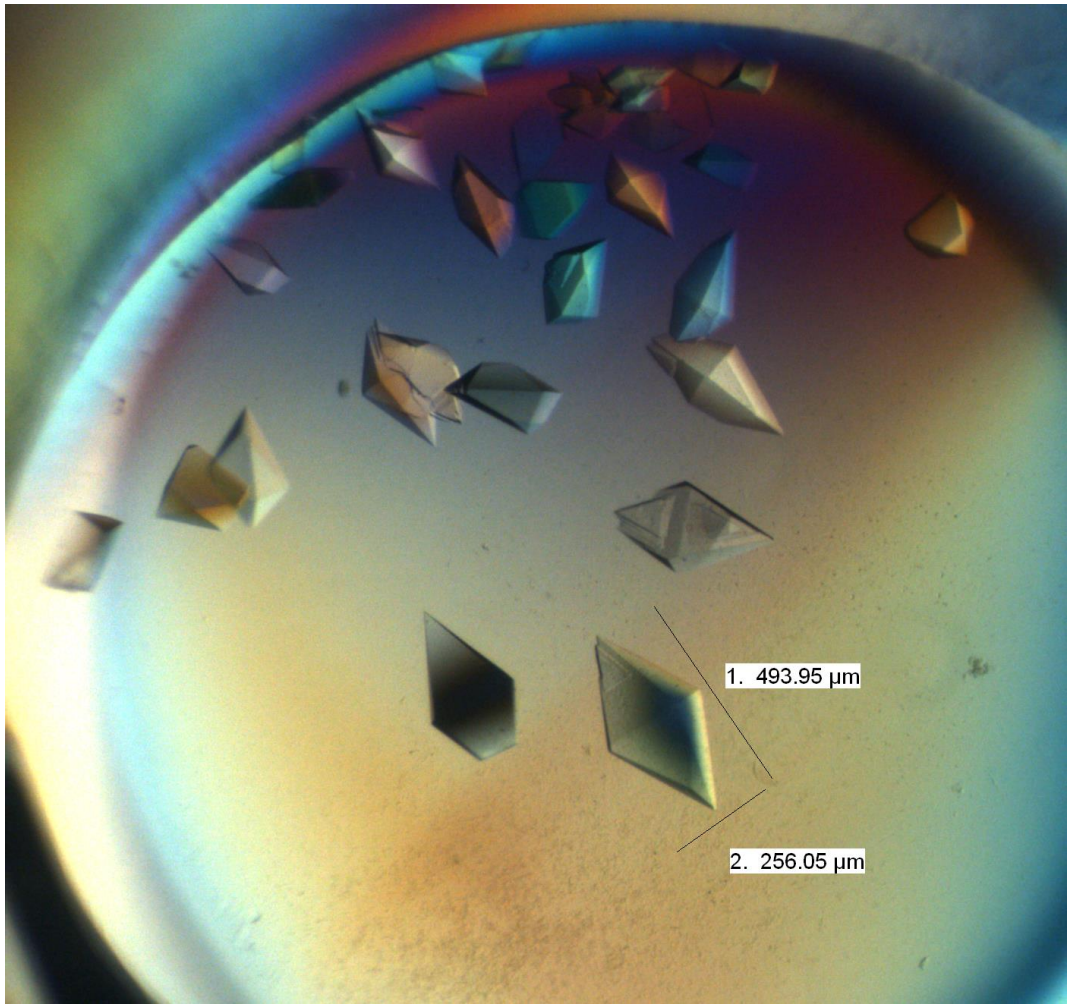

Protein Solution
Protein Crystal
Diffraction Data
PURIFIED
CONCENTRATED
PURE
STABLE
CLEAR
PRECISE


VAPOR DIFFUSION
HANGING DROP
SITTING DROP

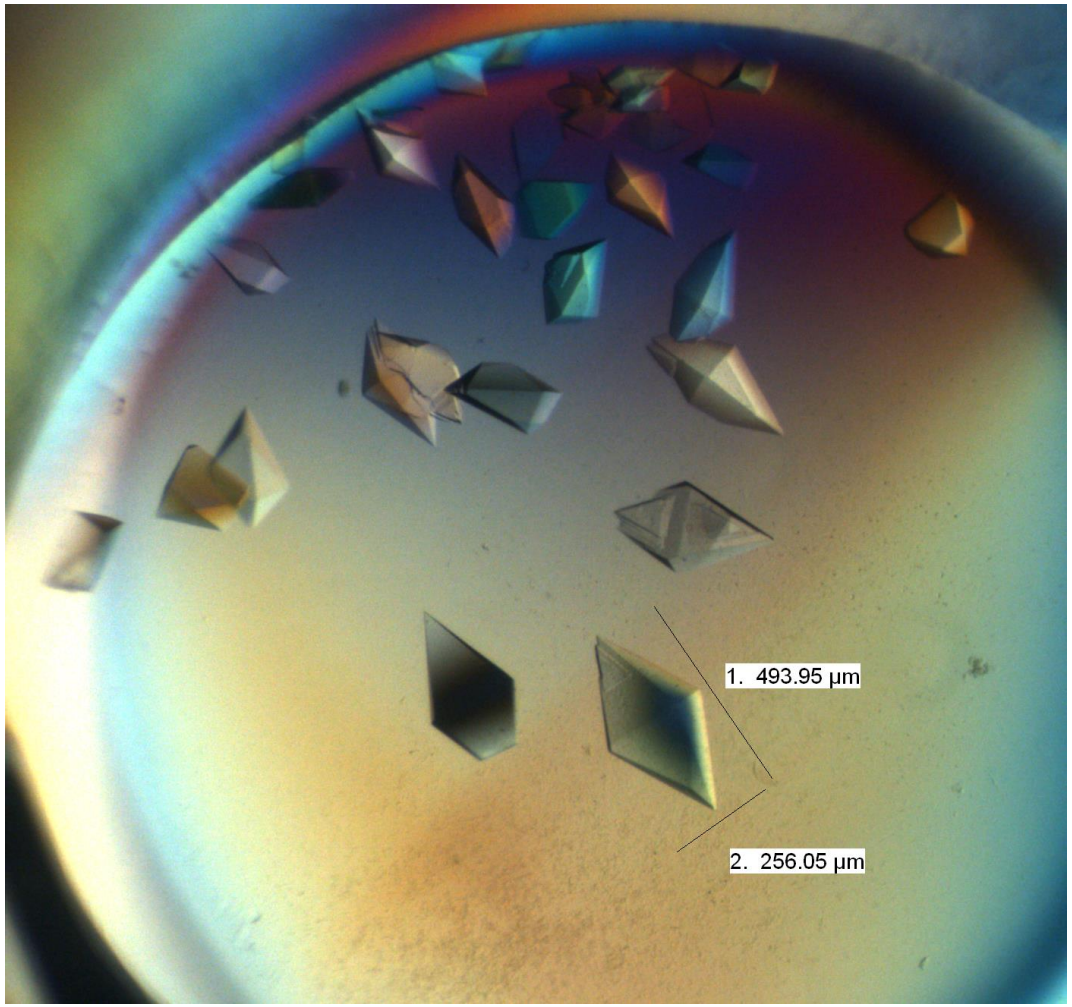

Protein Conc. x 1/2
Precipitant Conc. x 1/2
Vol. x 2
500µL REAGENT
1–2µL PROTEIN

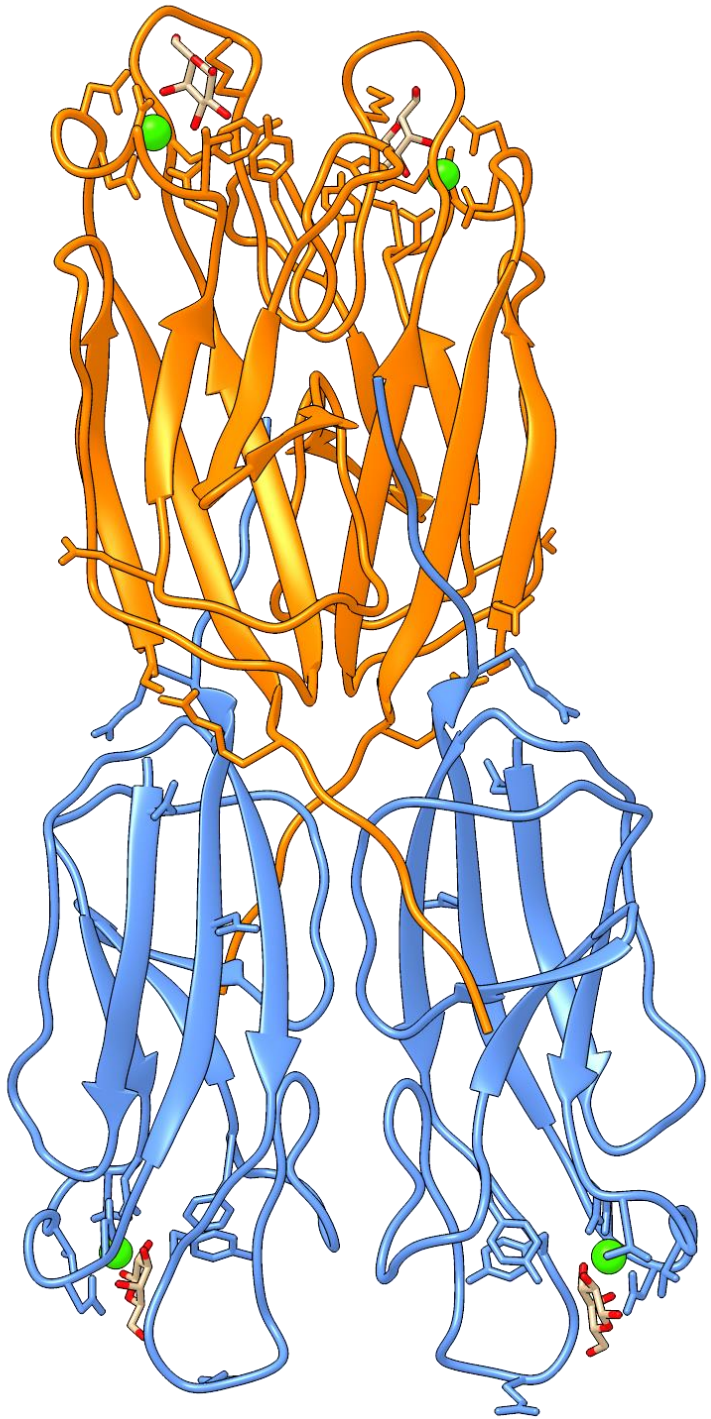

4 - 25 °C
SUPERSATURATION

Proteinové krystaly - PluLec



Proteinové krystaly





Co nás čeká?