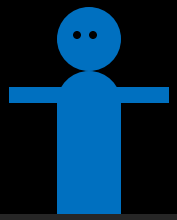
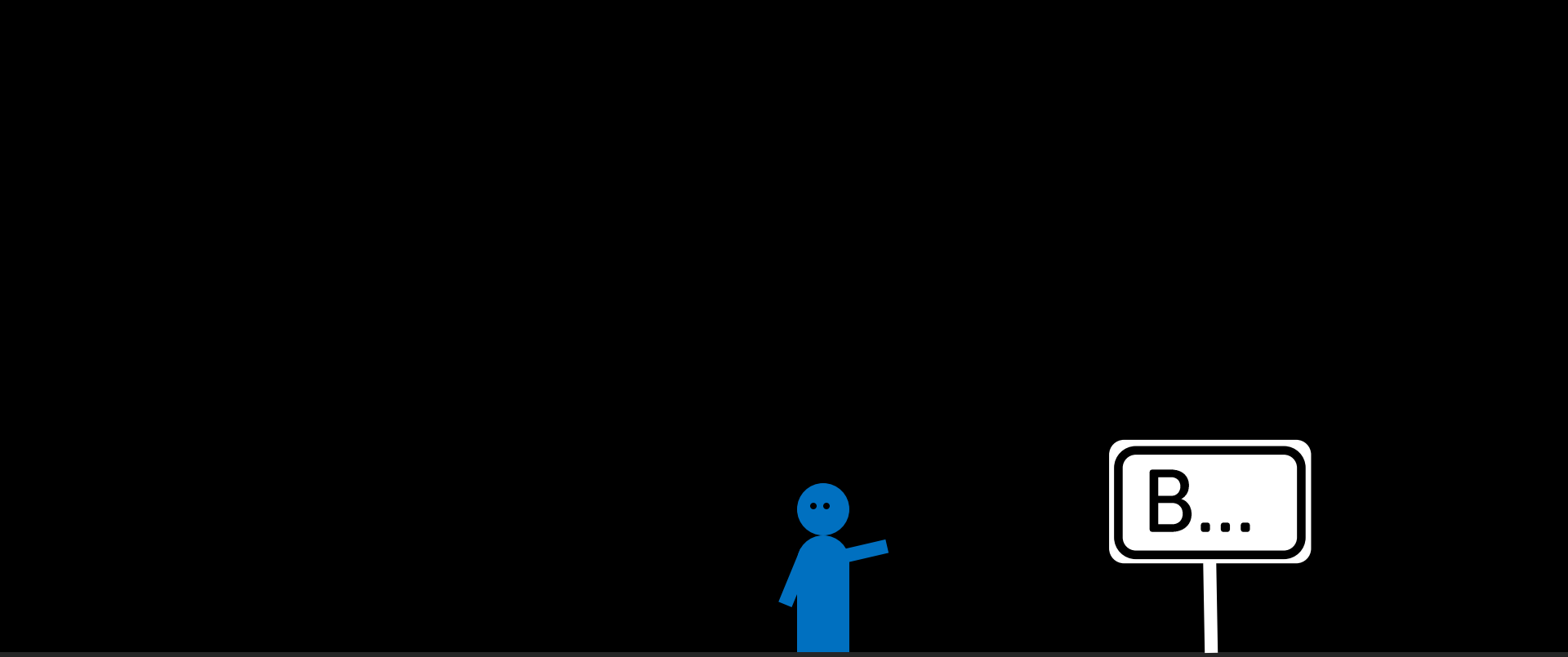
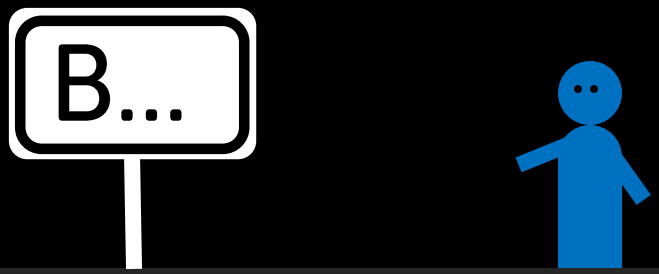
NOC KOSTOLOV 2017 CBBJ

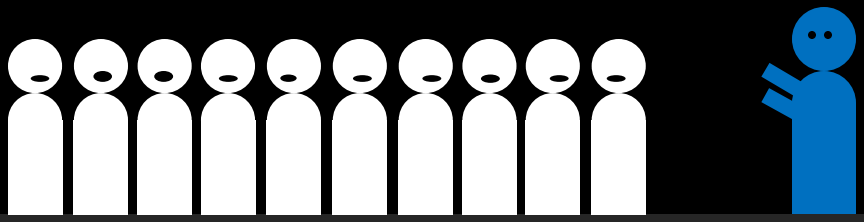
čítame vesmír

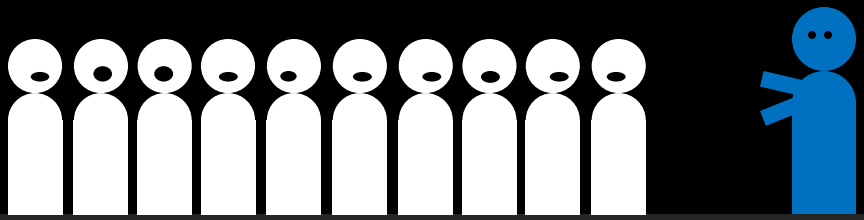
DANIEL NAGAJ FÚ SAV




B...


B...





fascinácia

fyzikou

fascinácia

fyzikou

fascinácia

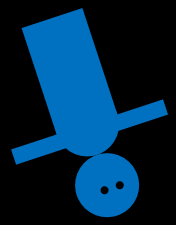
fyzikou

fascinácia

fyzikou

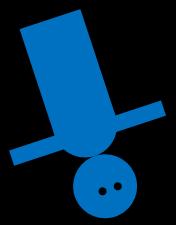
fascinácia

fyzikou



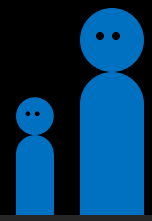
fascinácia

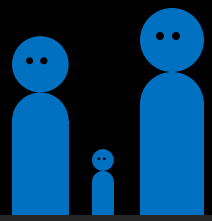
fyzikou

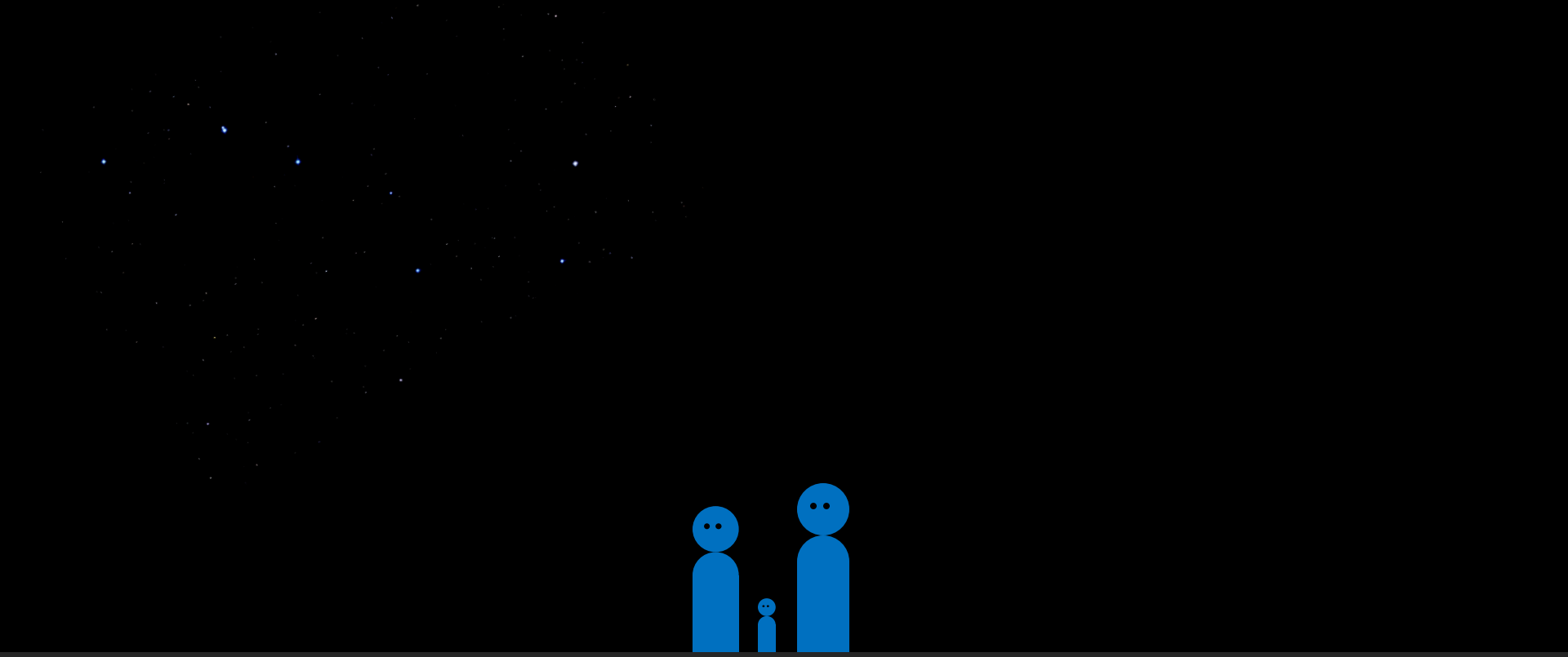


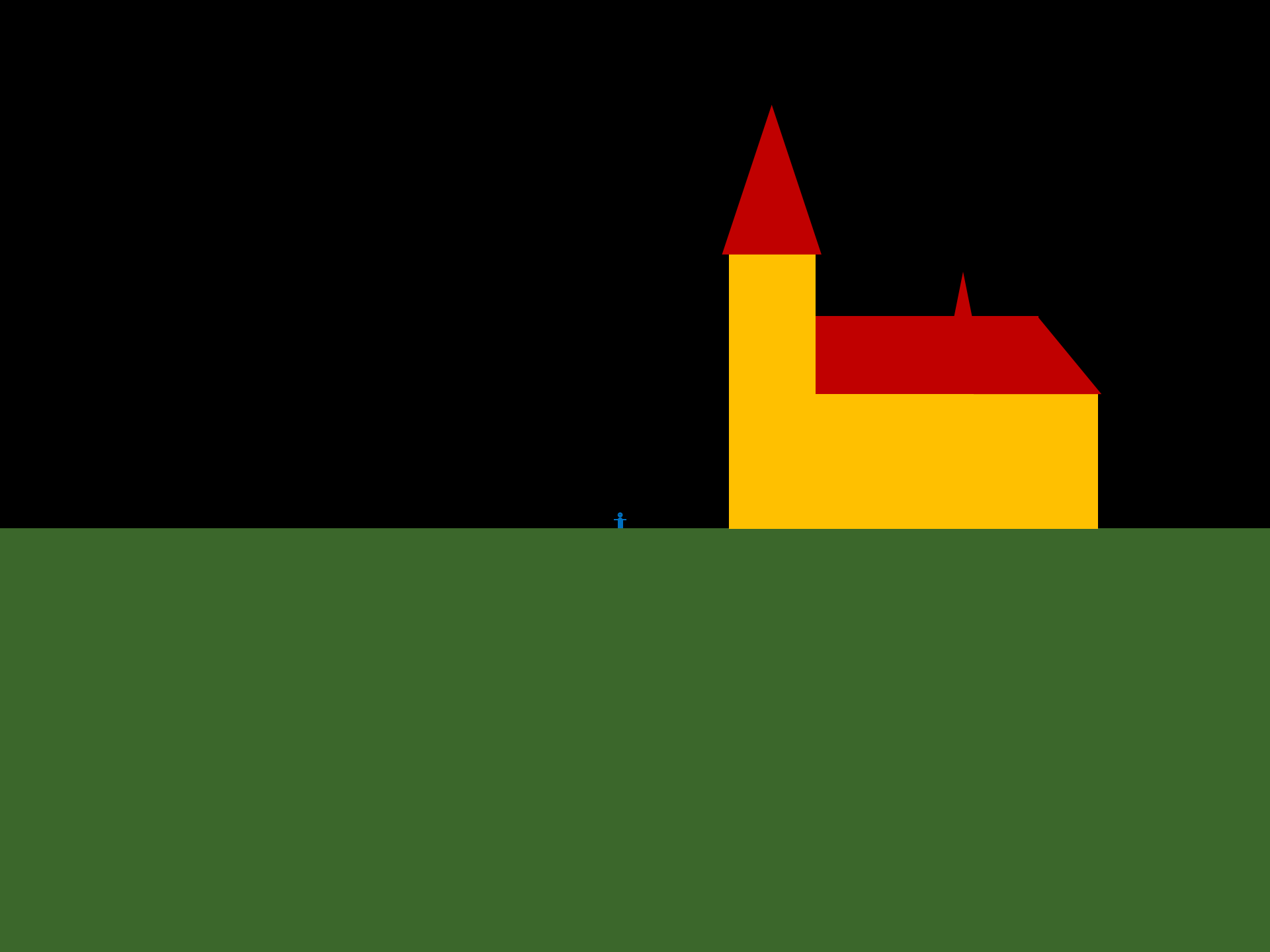
fascinácia

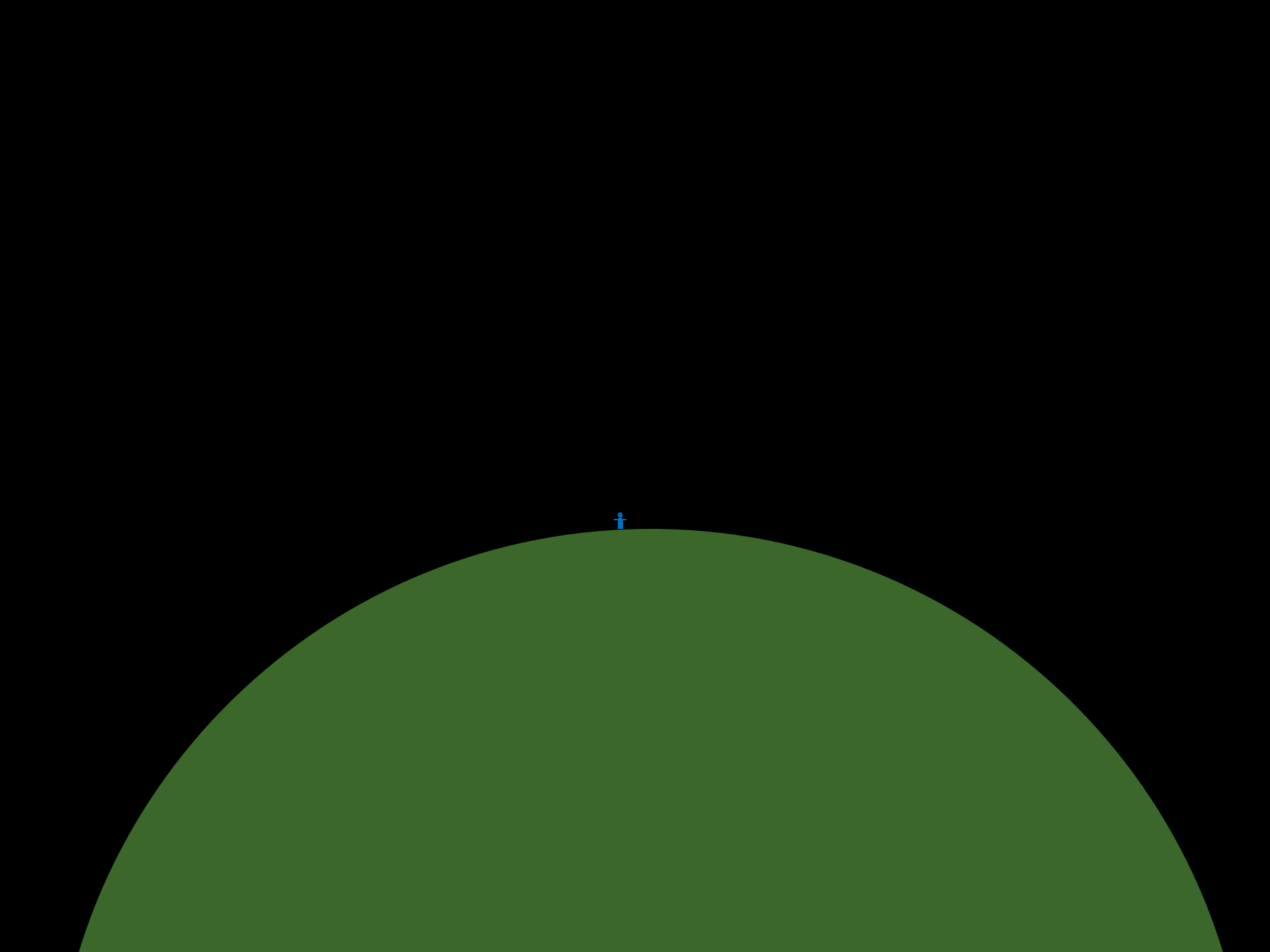
fyzikou

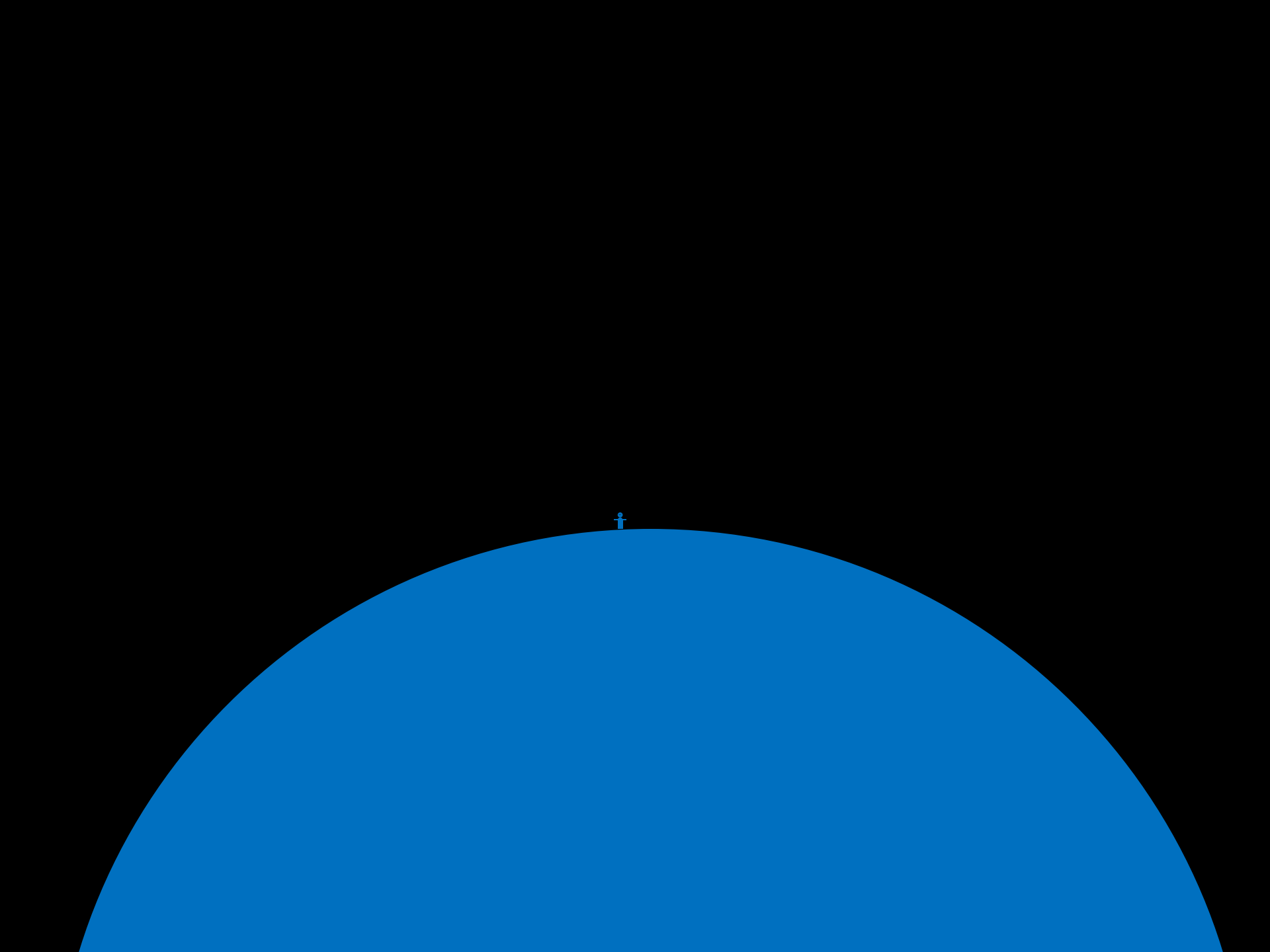


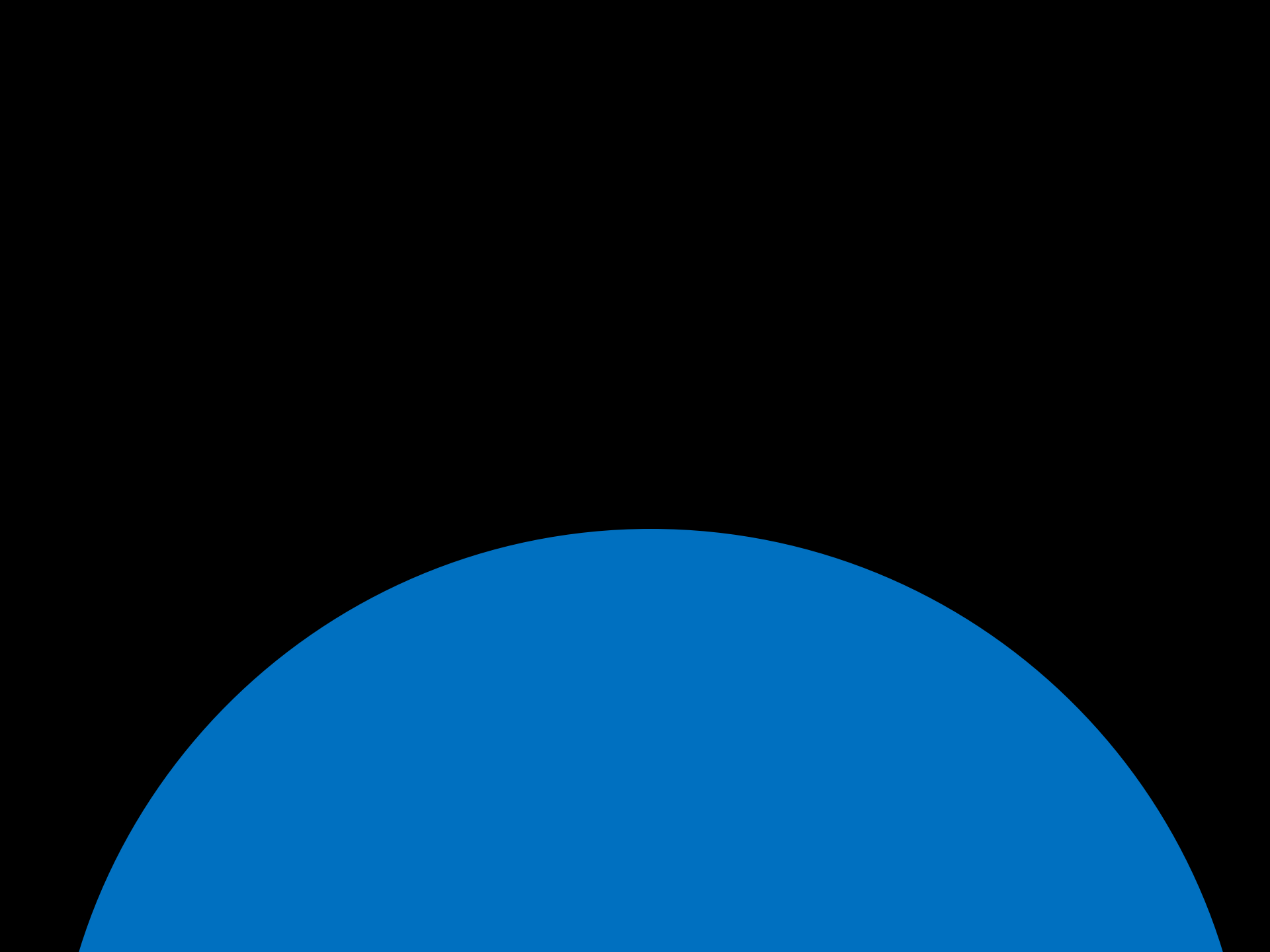


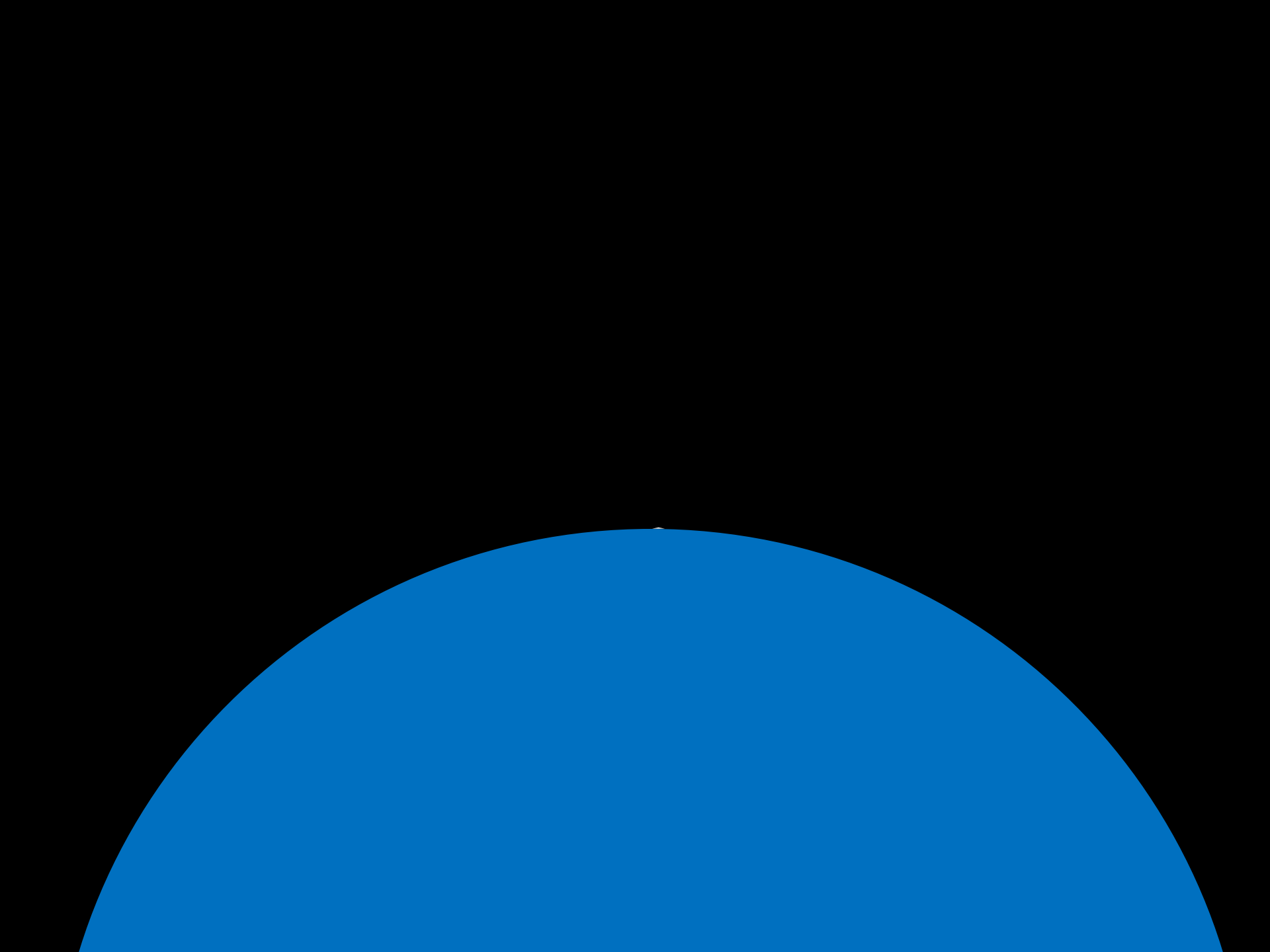












FIGVRA DOS COR POS CE LES TES

CEL VOLVM PRIMO HABITACVLVM

REVOLVÇÃO DO CEO DAS ESTRELAS

REVOLVÇÃO DO CEO E SATVRNO

REVOLVÇÃO DO CEO E IVPITER

REVOLVÇÃO DE MARS

REVOLVÇÃO DO SOL

REVOLVÇÃO DE VENUS

REVOLVÇÃO DE MERCVRIO

R. DA LVA

AR

FOGO

DE IIS ELEMENTORVM ASCENSIONIBVS

EN 36000 ANOS

EN TRINTA ANNOS

EN DOZE ANNOS

EN DOVS ANNOS

EN 365 DIAS E SEIS ORAS

EN 273 DIAS E 23 ORAS

EN 70 DIAS E 7 ORAS

EN 27 DIAS E 8 ORAS

LVNA

MERCVRIO

VENVS

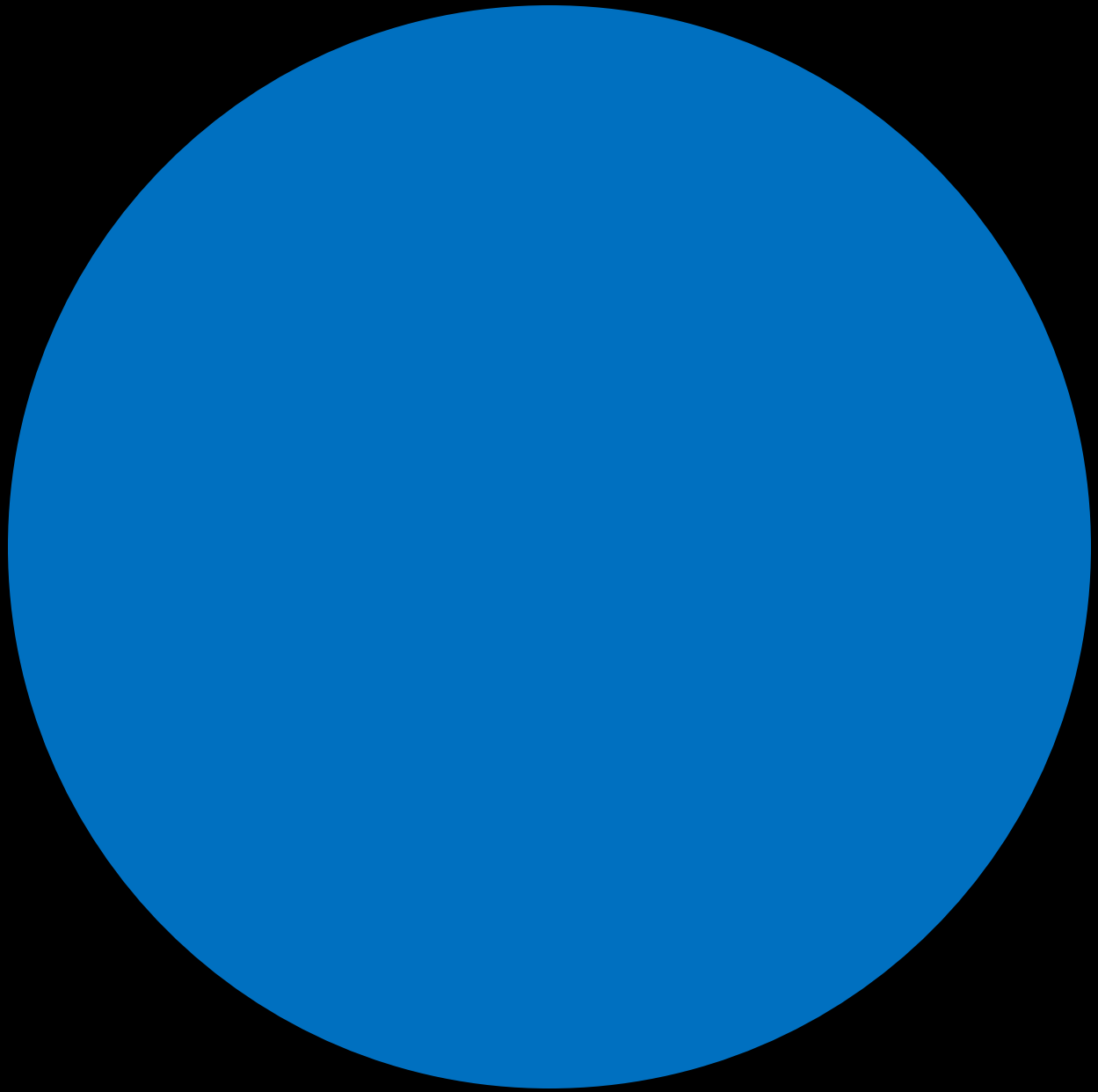
SOL

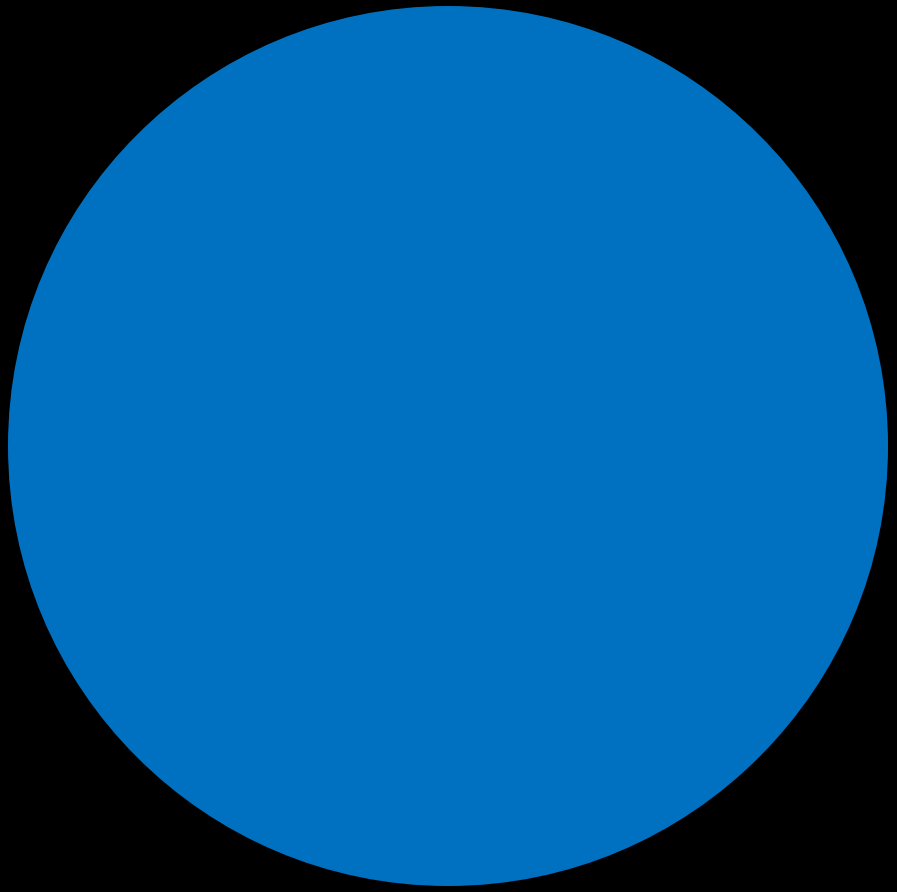
MARS

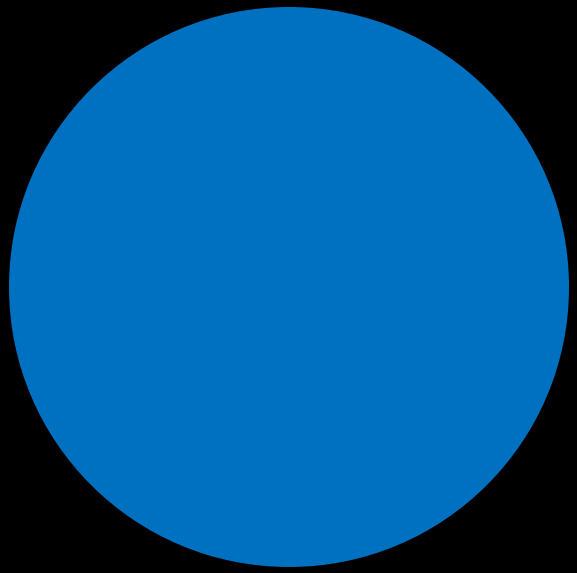
IVPITER

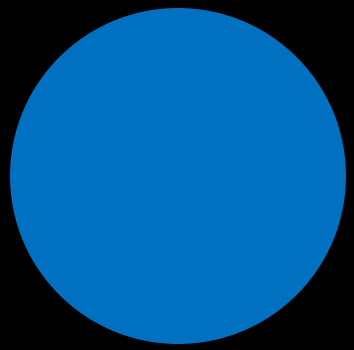
SATVRNO

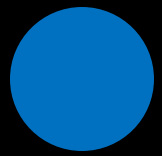
FIRMAMENTO

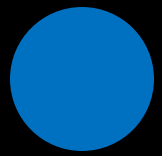


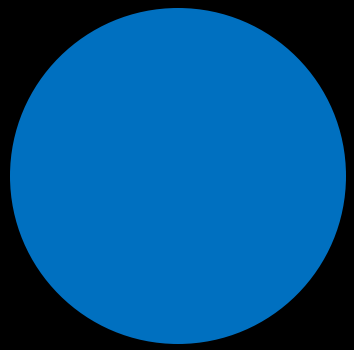


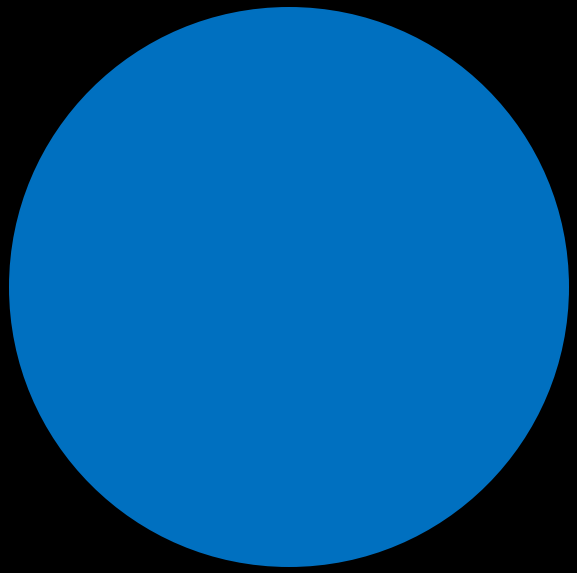


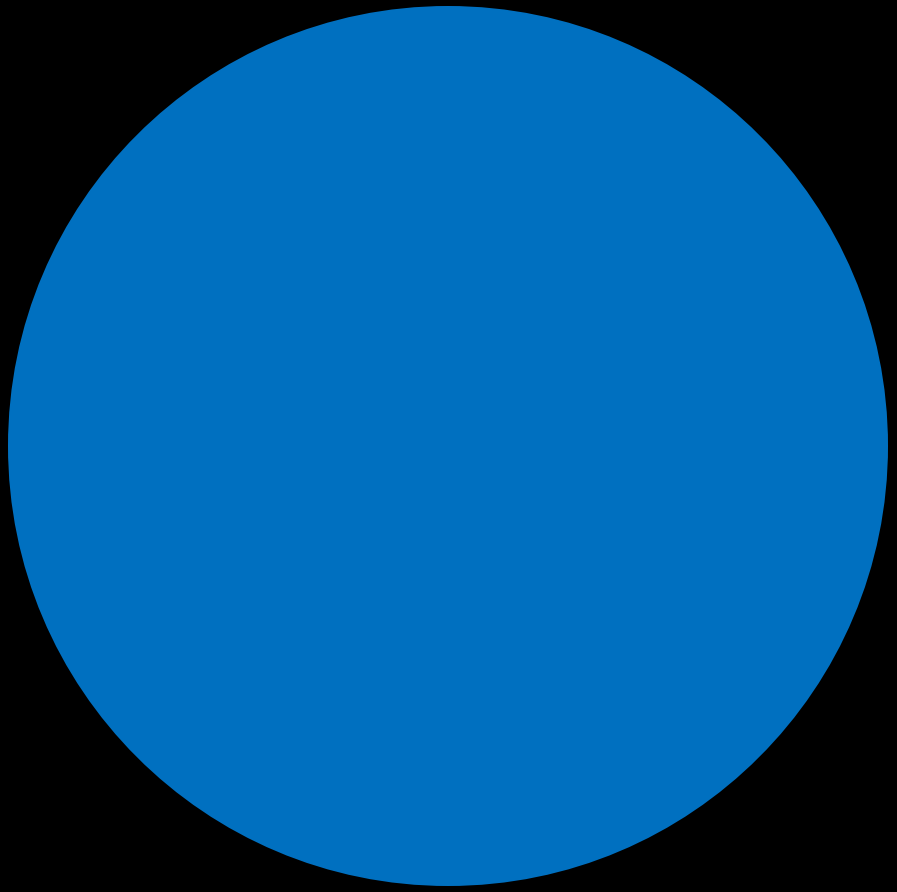


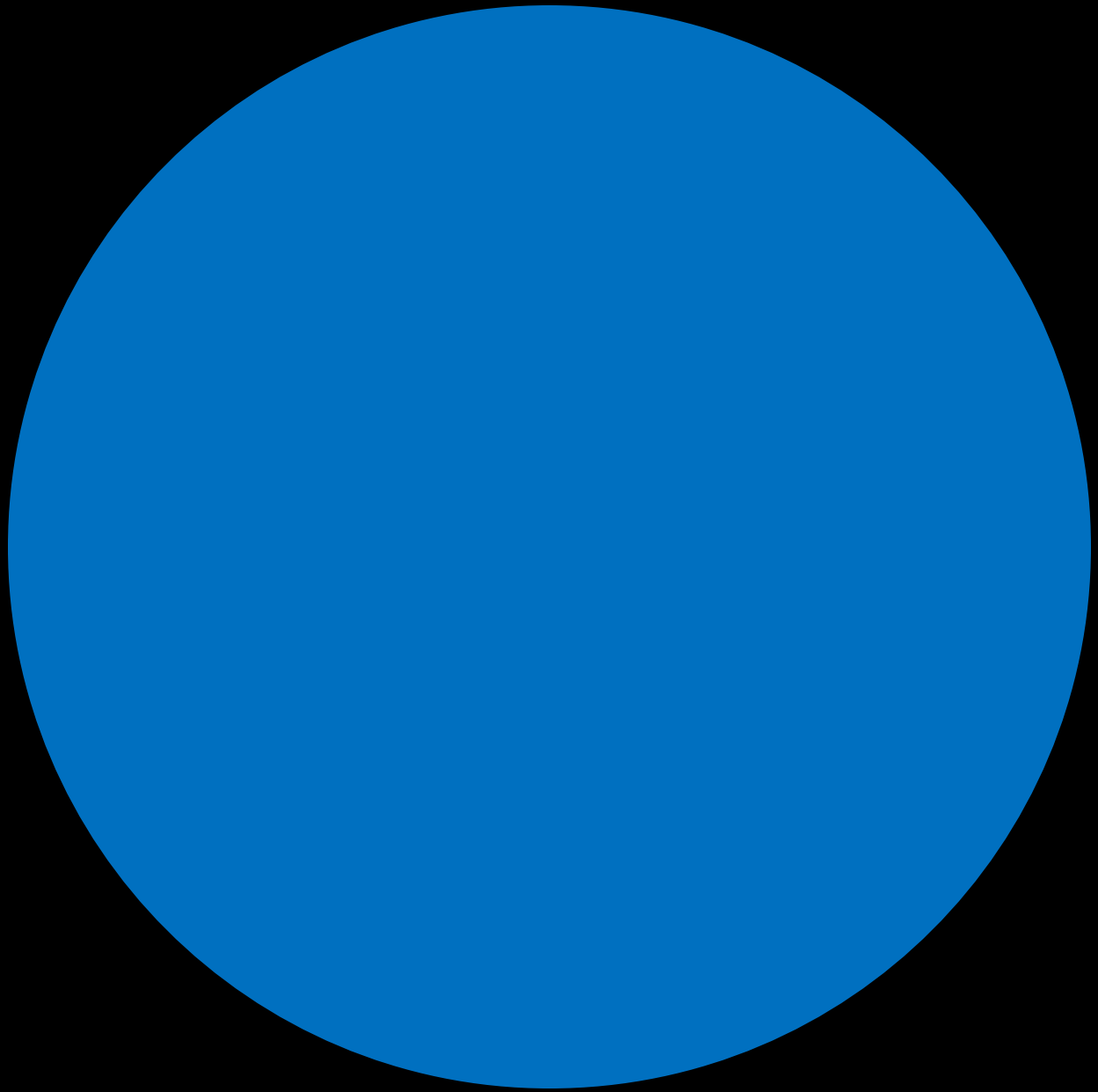


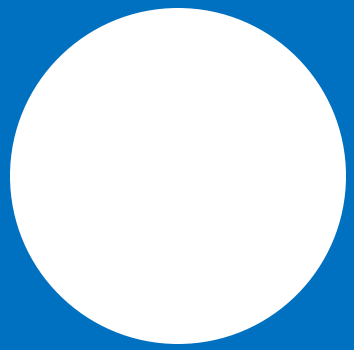


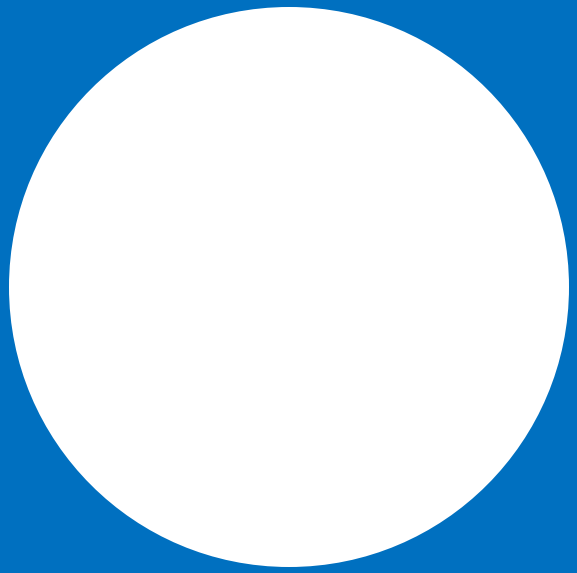


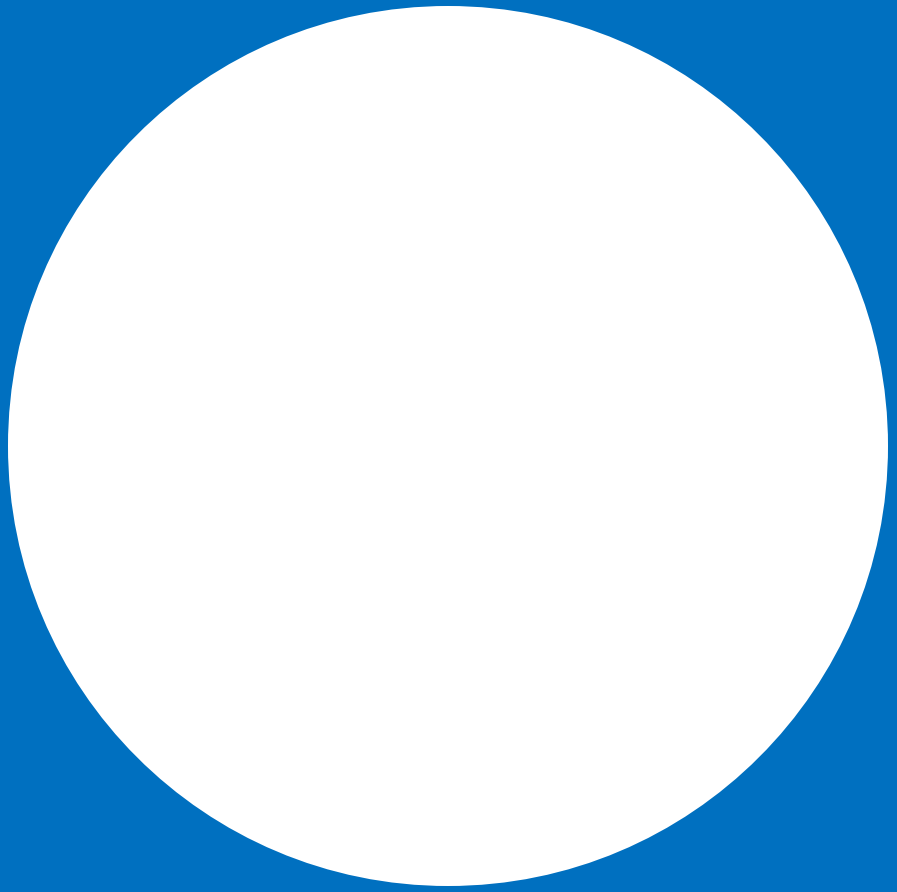


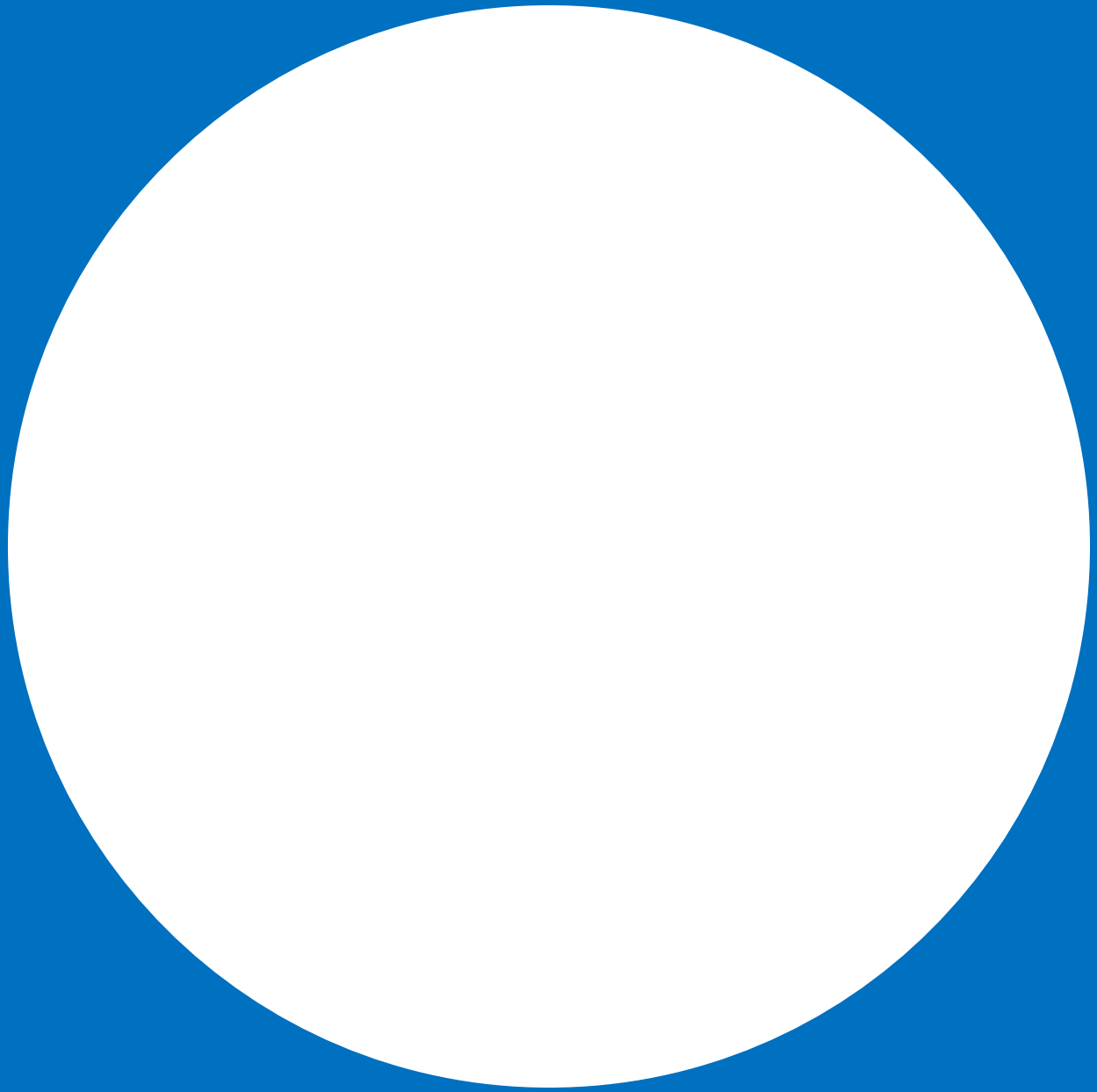


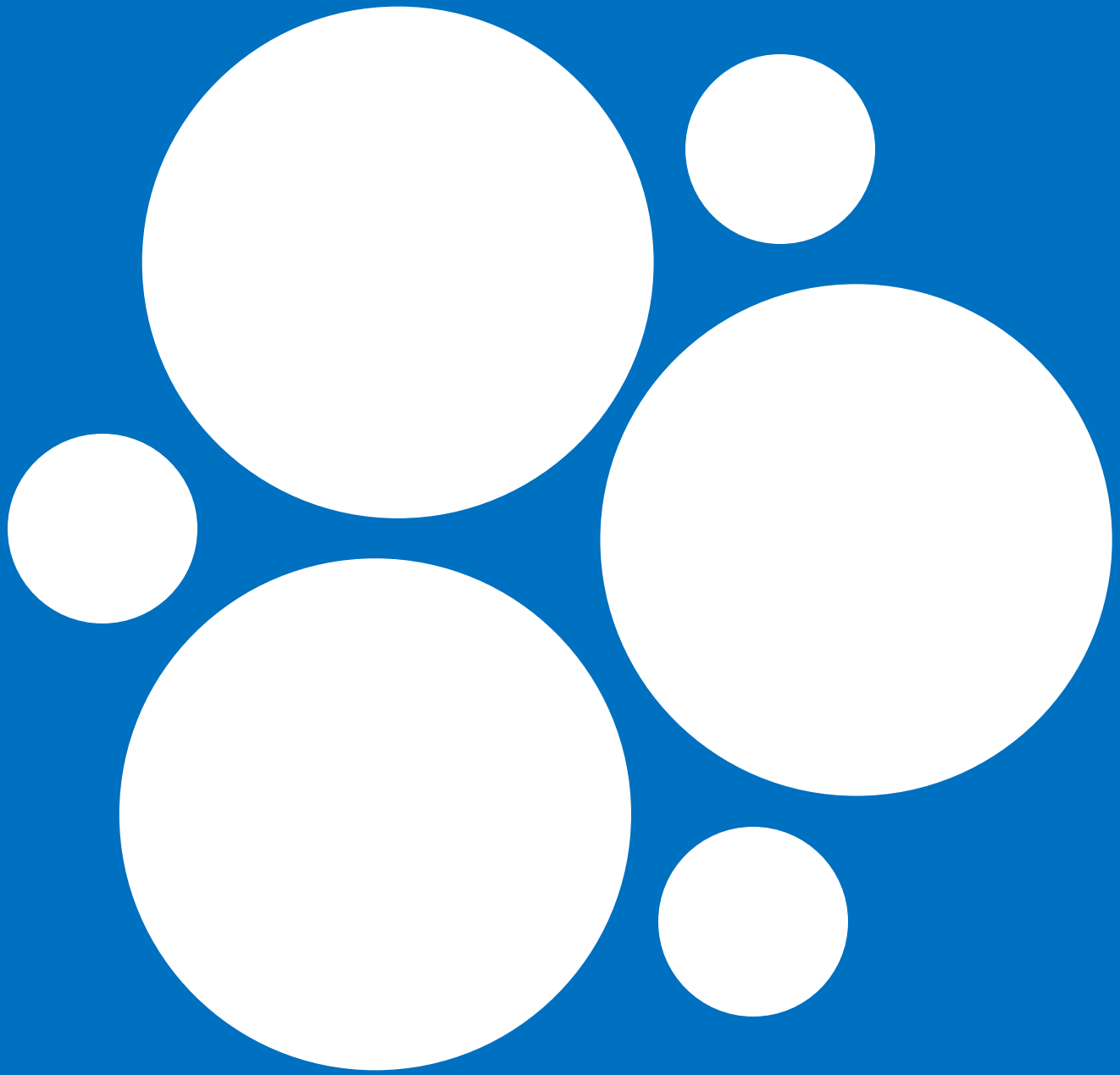


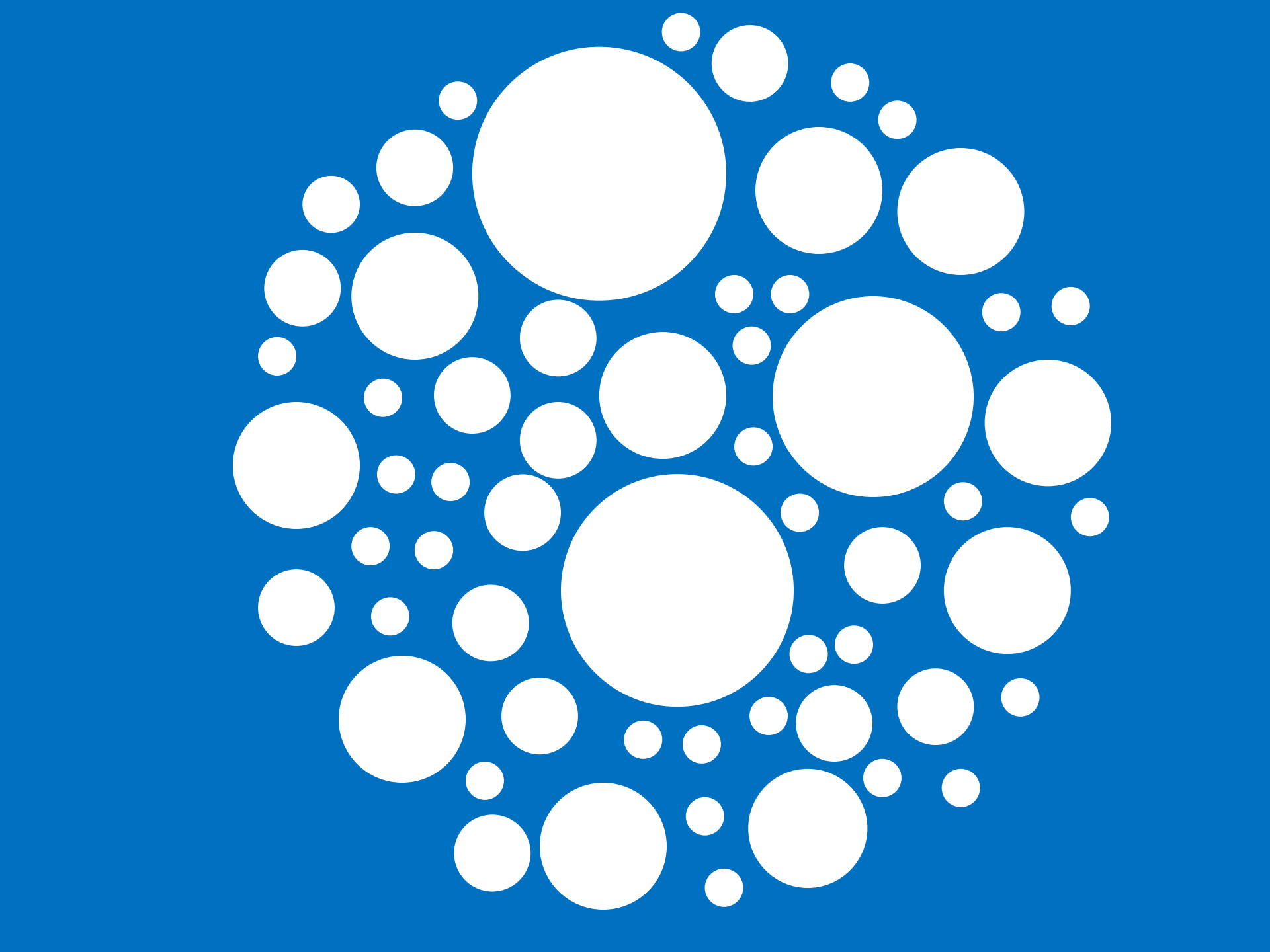


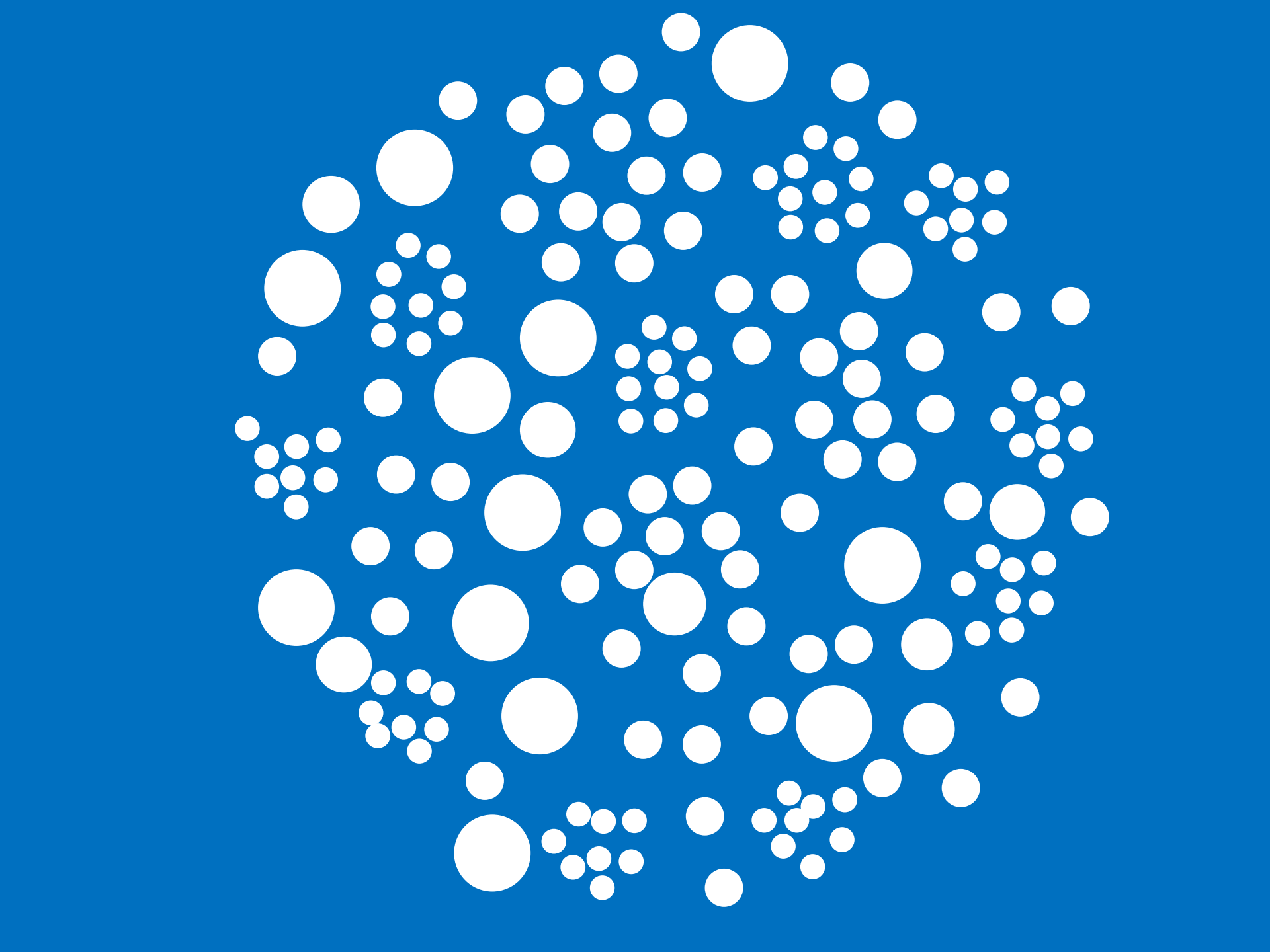




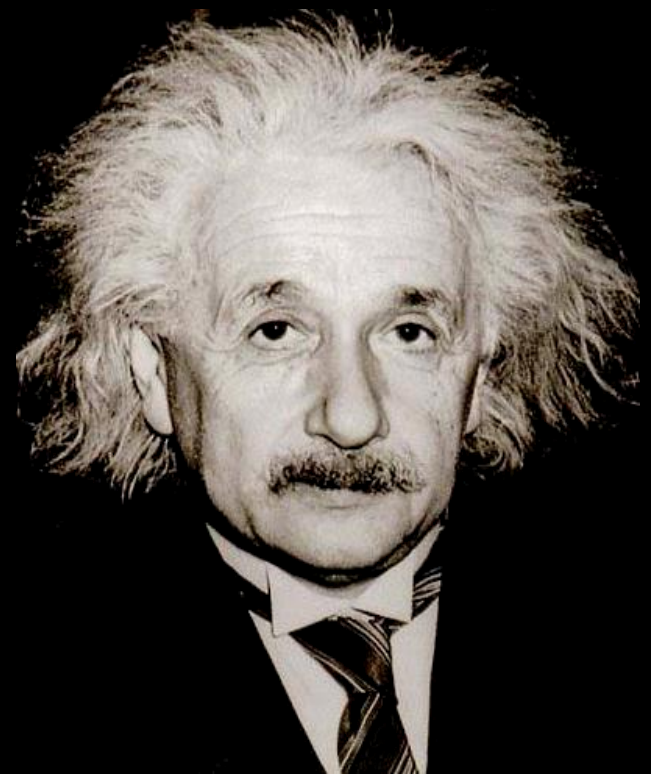


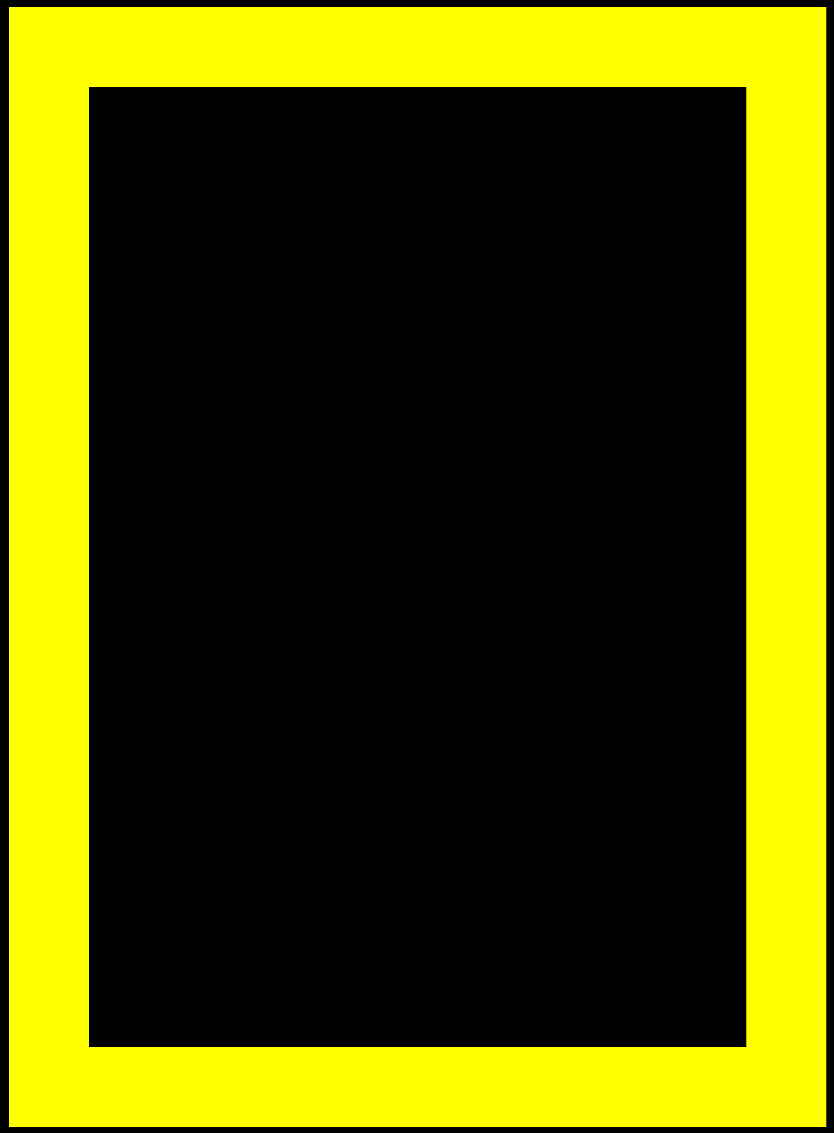






"Najnepochopiteľnejšie na vesmíre je to, že je **zrozumiteľný**."

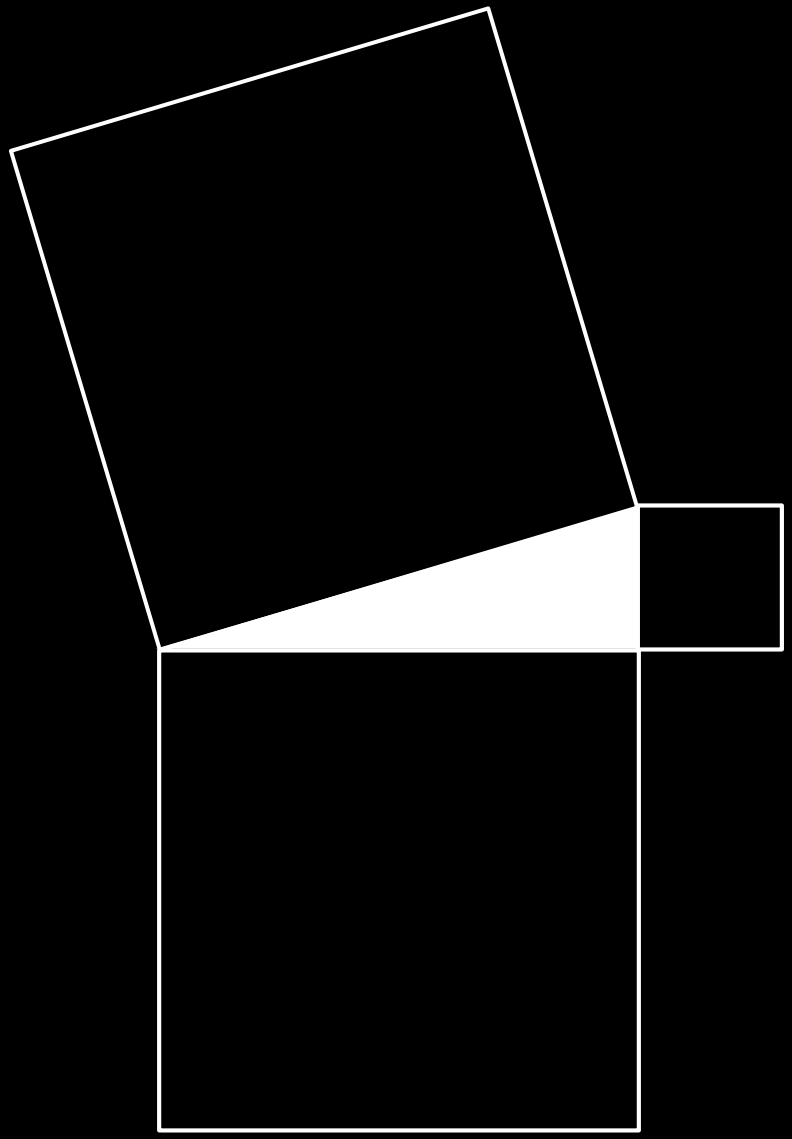


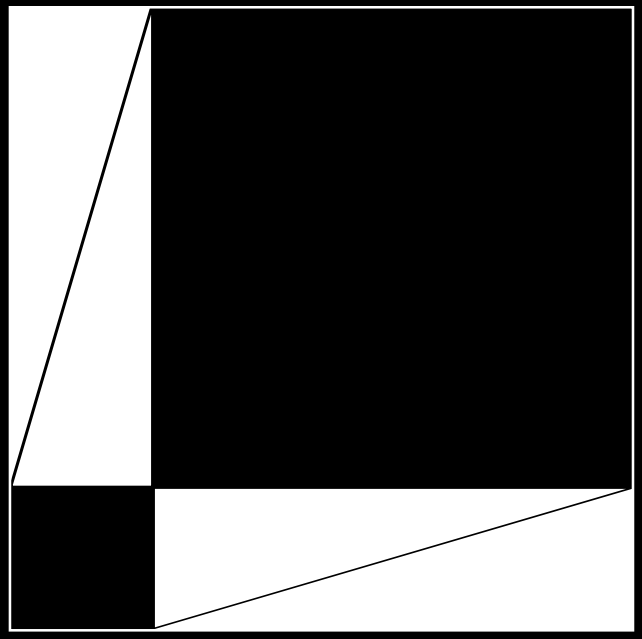


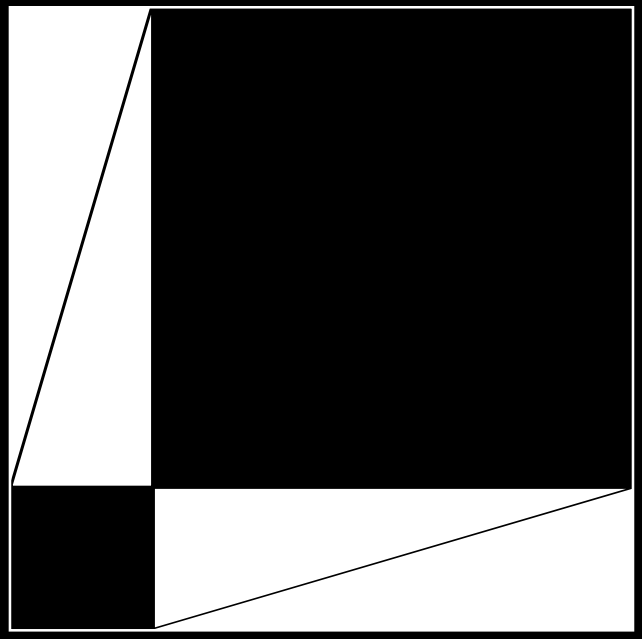
Čítame vesmír, tú veľkú božiu knihu,
písmo sväté prítomného okamihu.
Čítame sústavne, každým svojím zmyslom.
Telo je klavírom, duch je klaviristom.

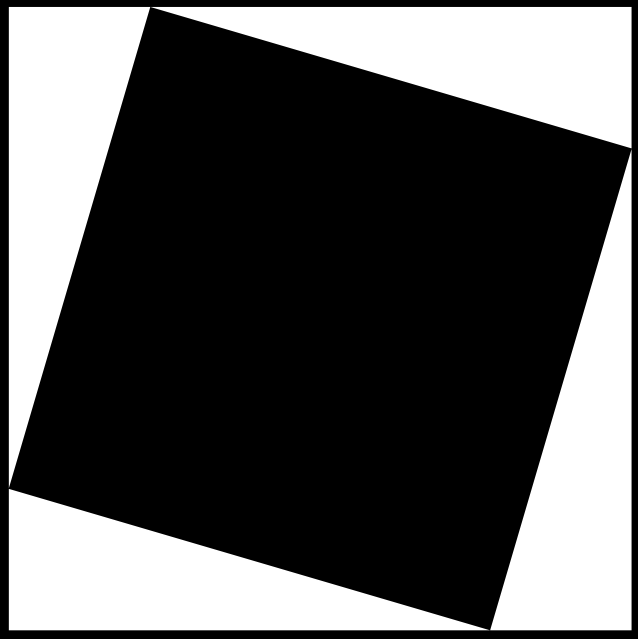
Daniel Pastirčák, Proglas IX

dôkaz



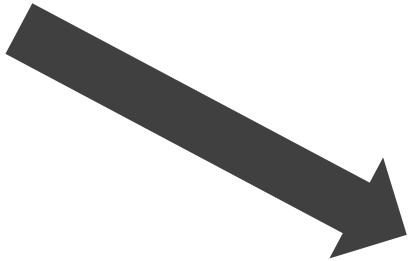




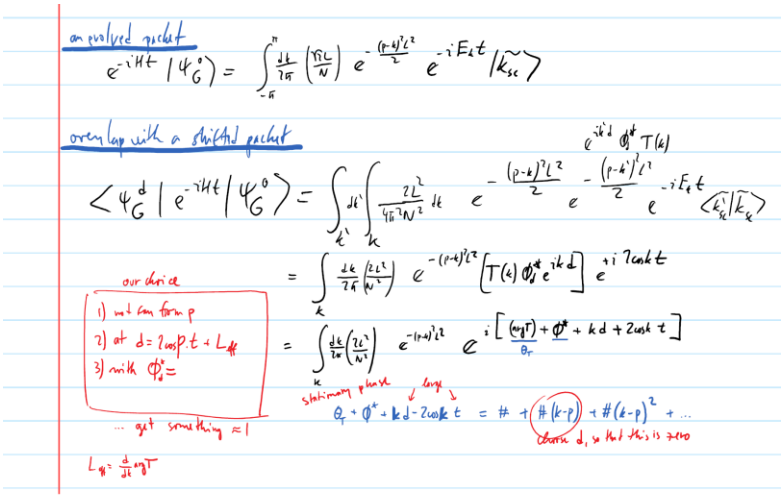


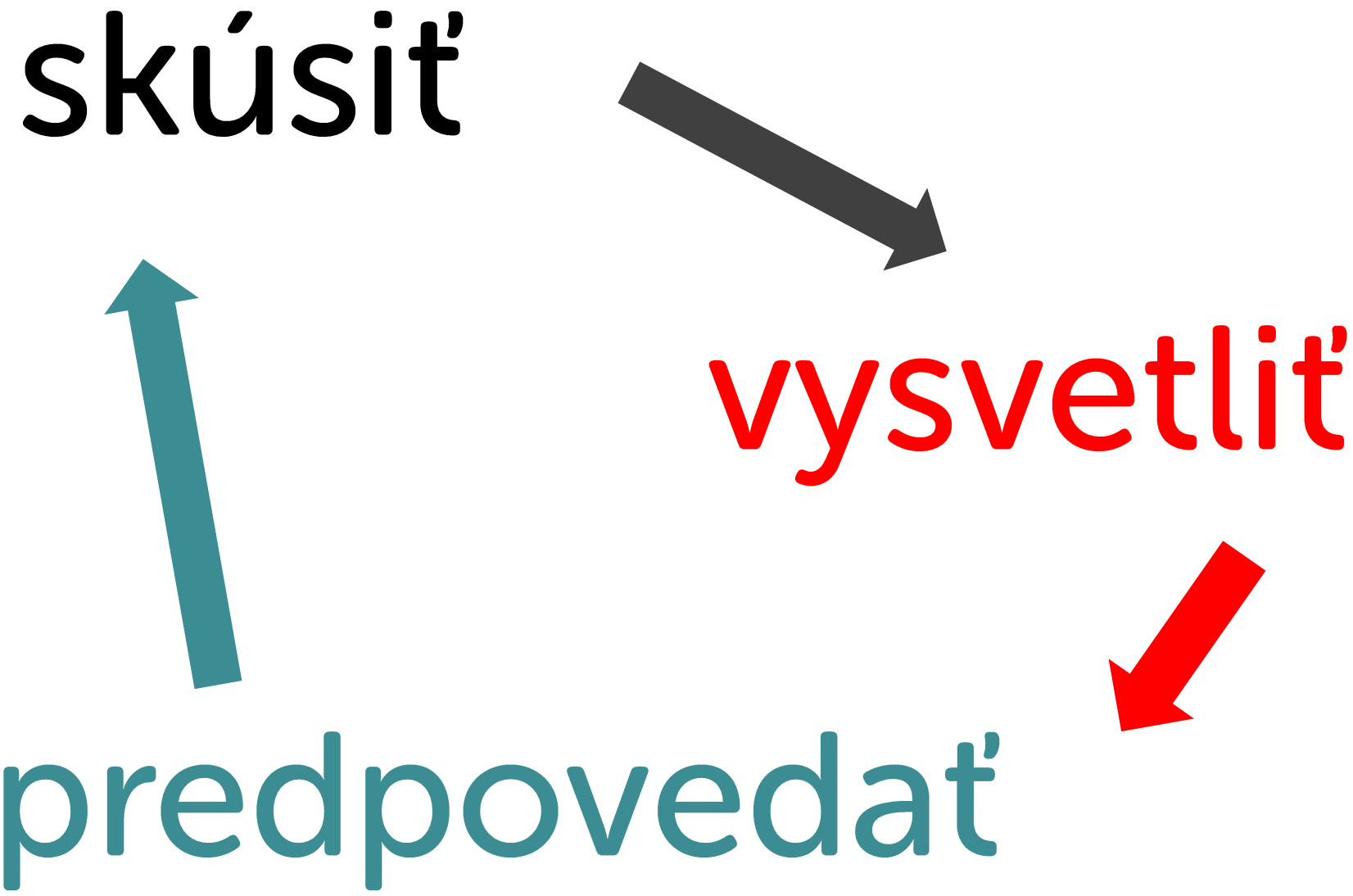
skúsiť

skúsiť

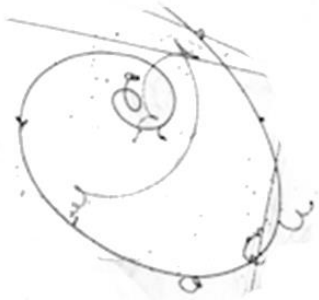


popísať



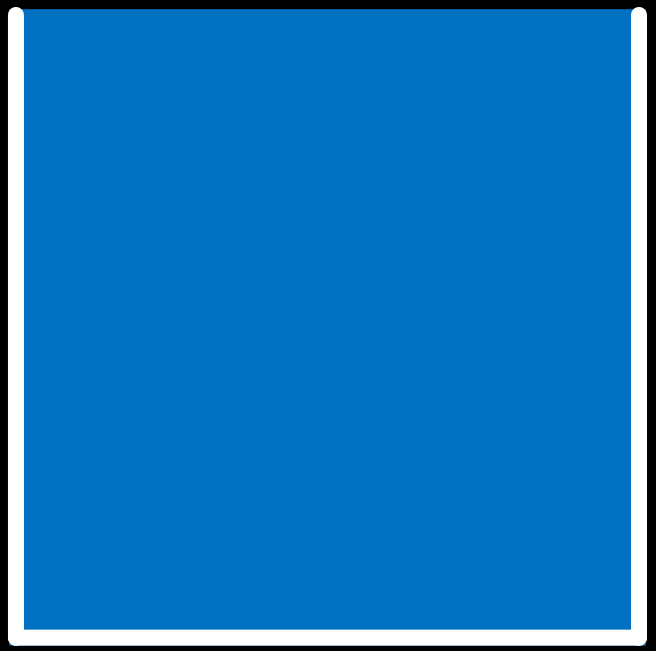

skúsiť
vysvetliť
predpovedať

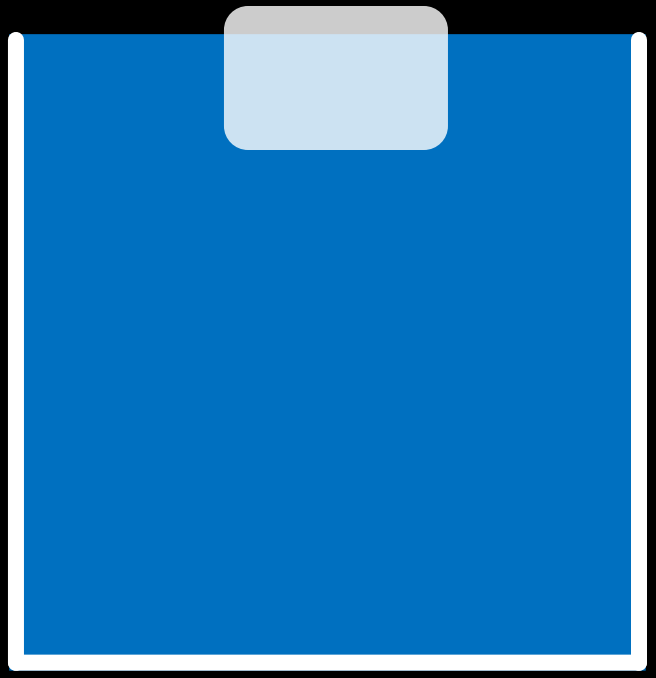
skúsiť



vysvetliť

predpovedať

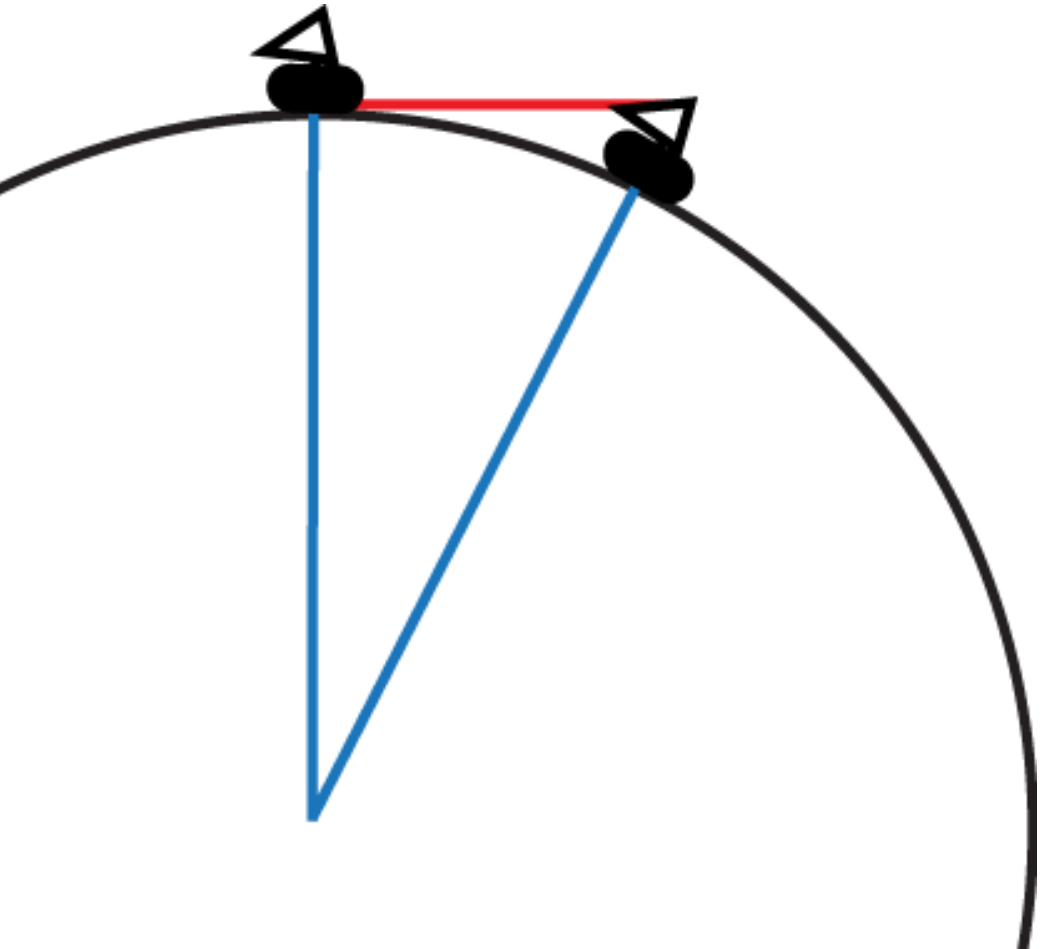


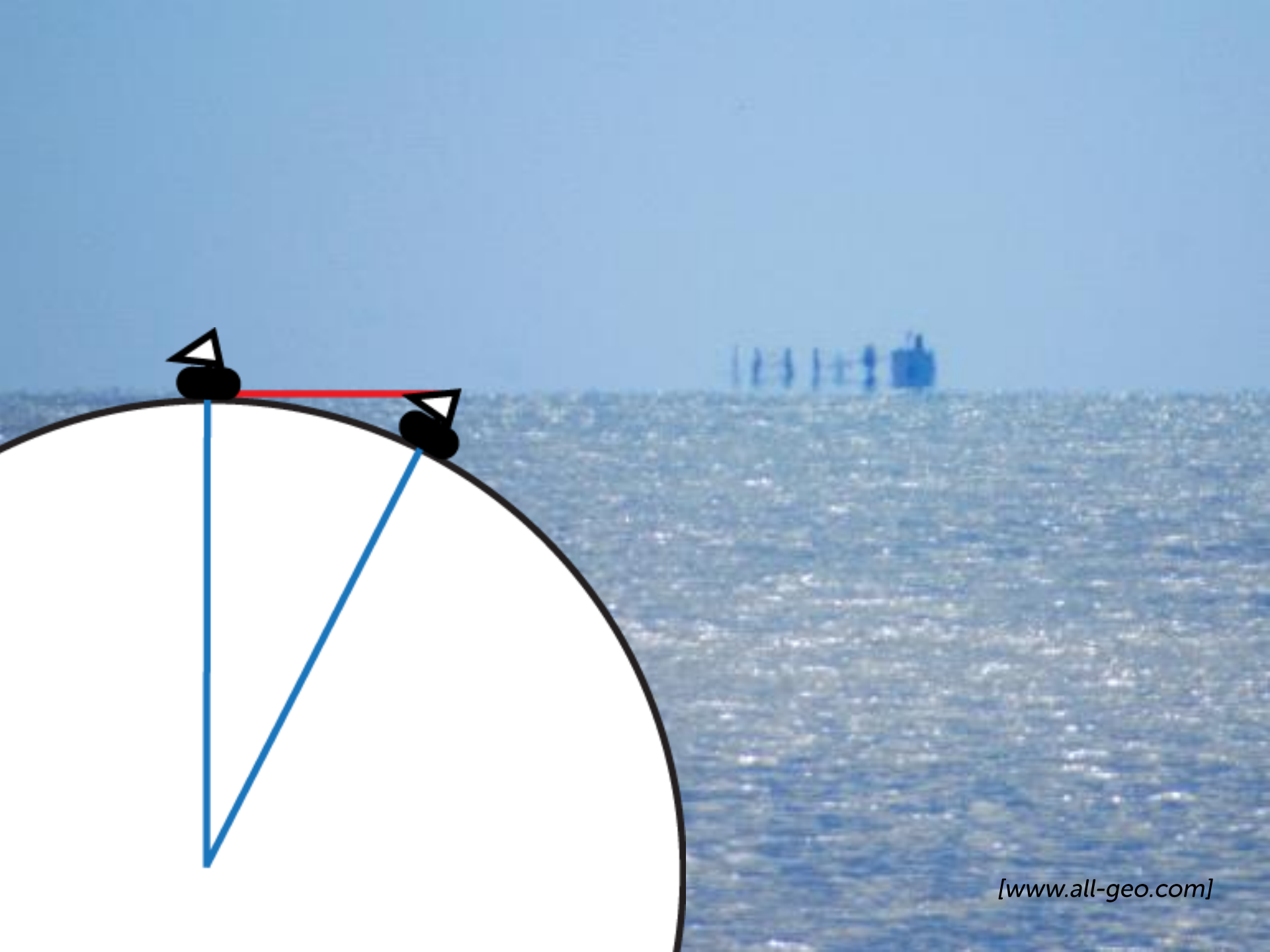


Vyleje sa, keď sa roztopí?

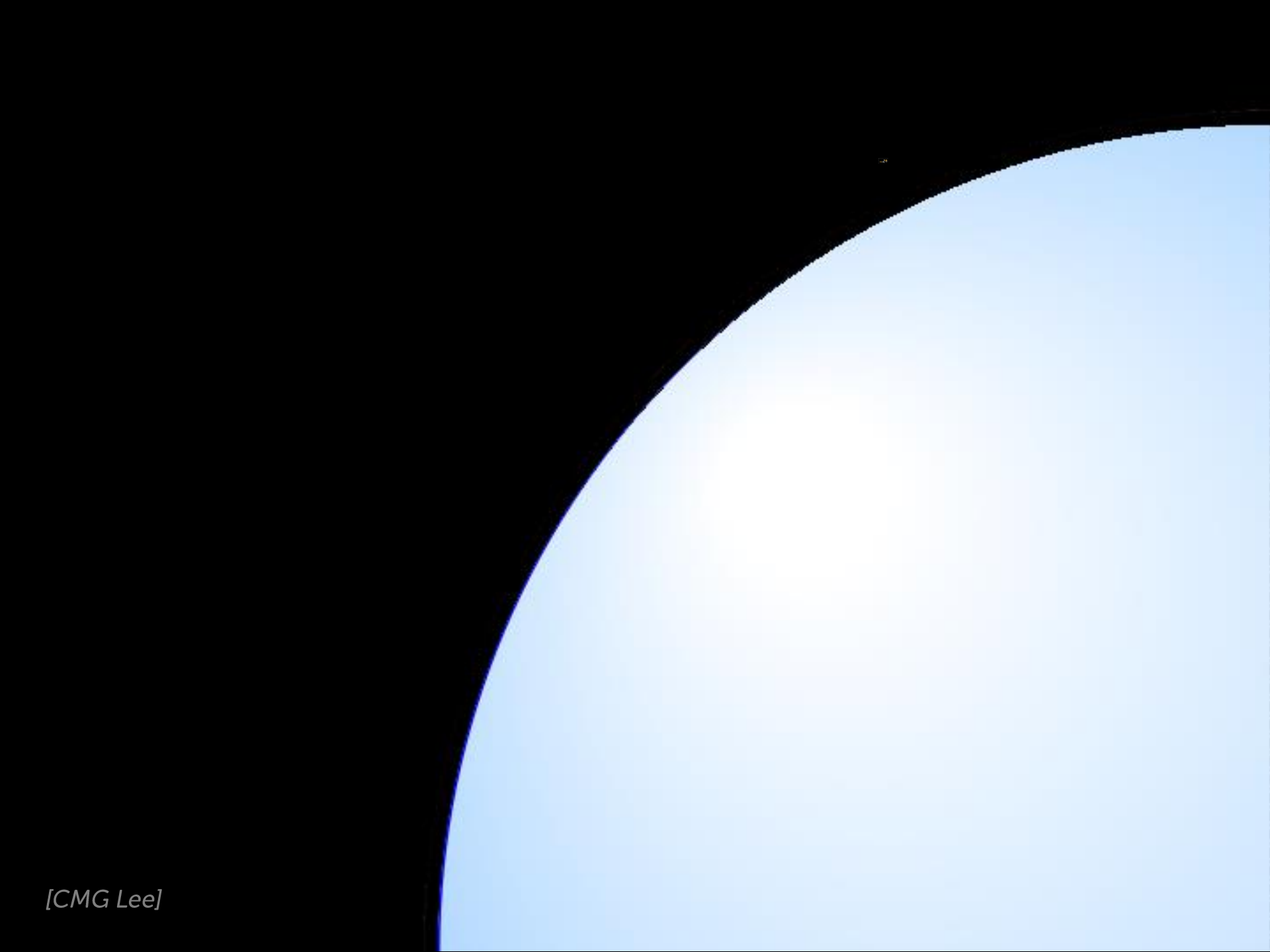
Je Zem guľatá?

Flat Earth: Spirit Level Flight Experiment




[www.all-geo.com]

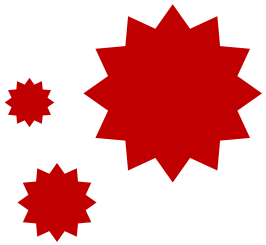
[naturfoto.cz, Jiří Bohdal]


[CMG Lee]

1

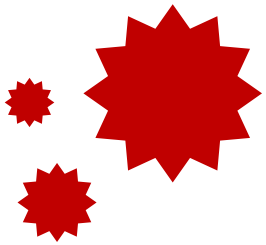
obrovské diaľavy

dlhá cesta svetla hviezd k nám



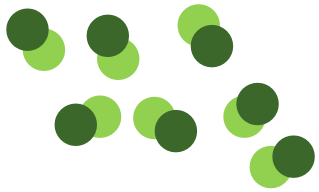
1 **obrovské diaľavy**

dlhá cesta svetla hviezd k nám



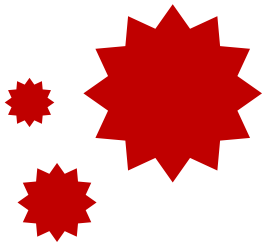
2 **mikro, nano**

svet, z ktorého sa skladá ten náš



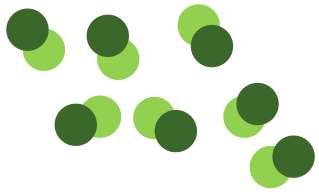
1 **obrovské diaľavy**

dlhá cesta svetla hviezd k nám



2 **mikro, nano**

svet, z ktorého sa skladá ten náš

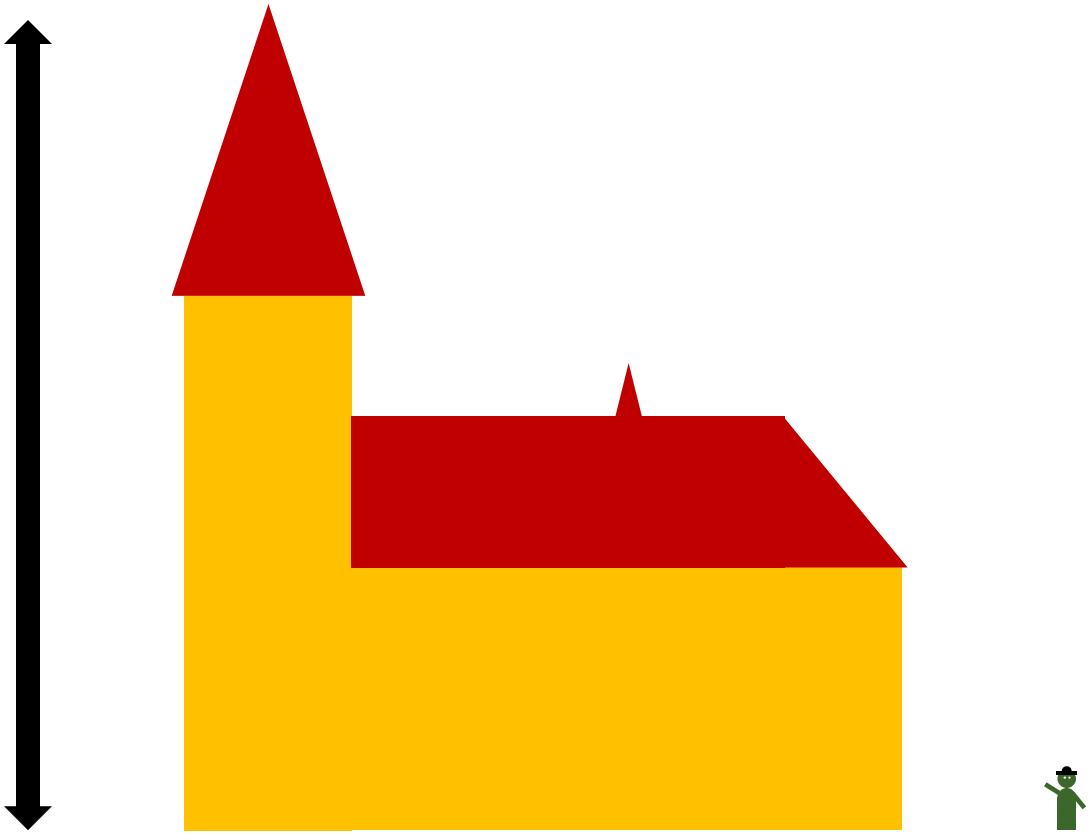


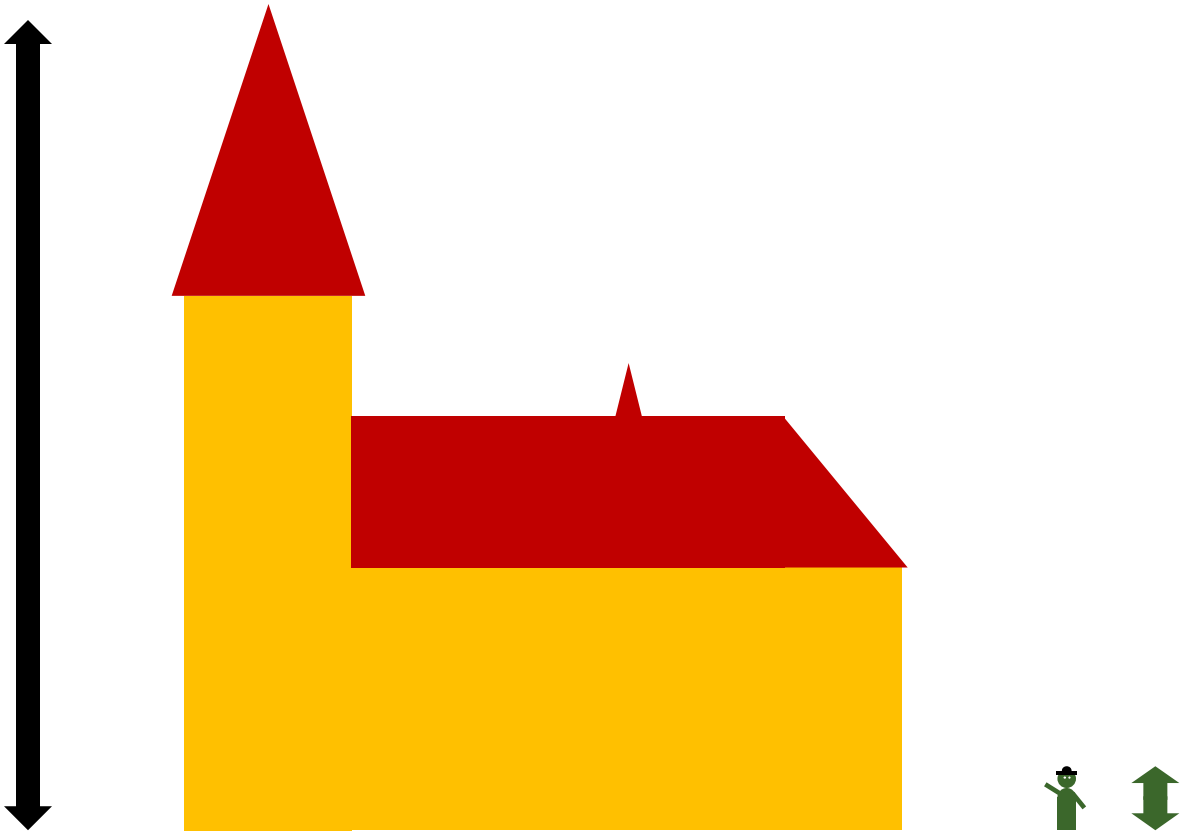
3 **ťažké počítanie**

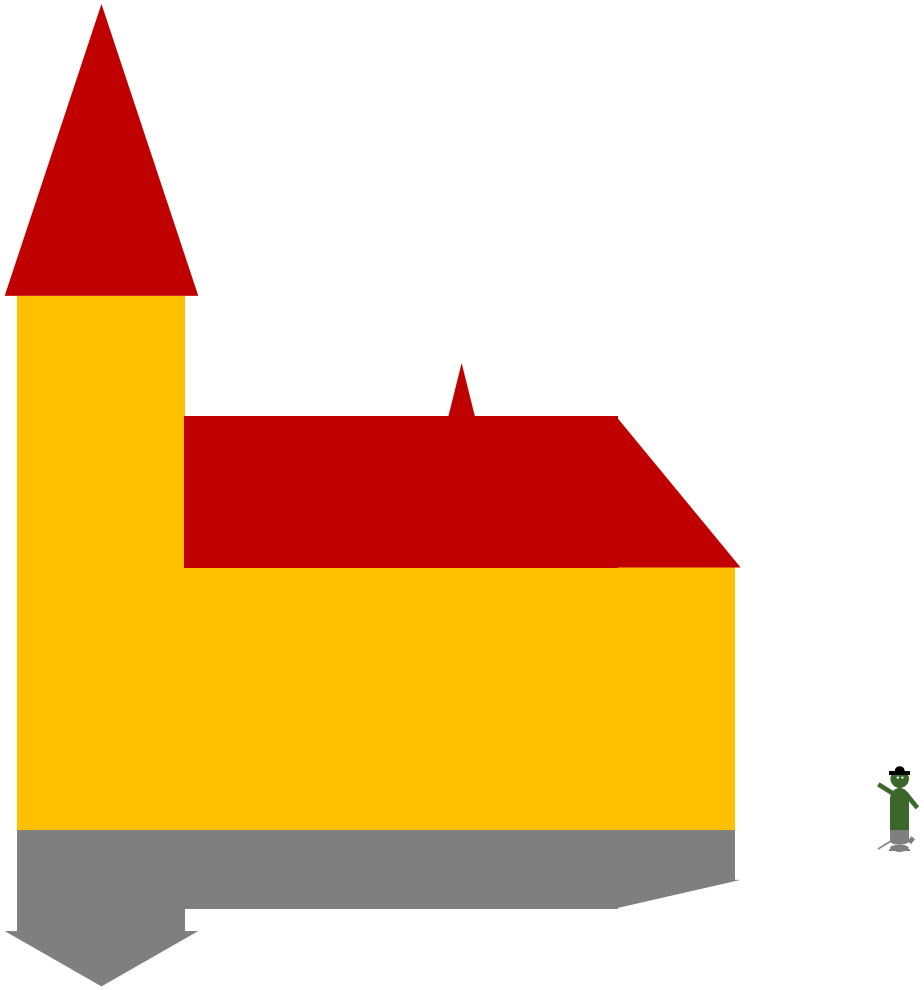
aj pre počítače budúcnosti

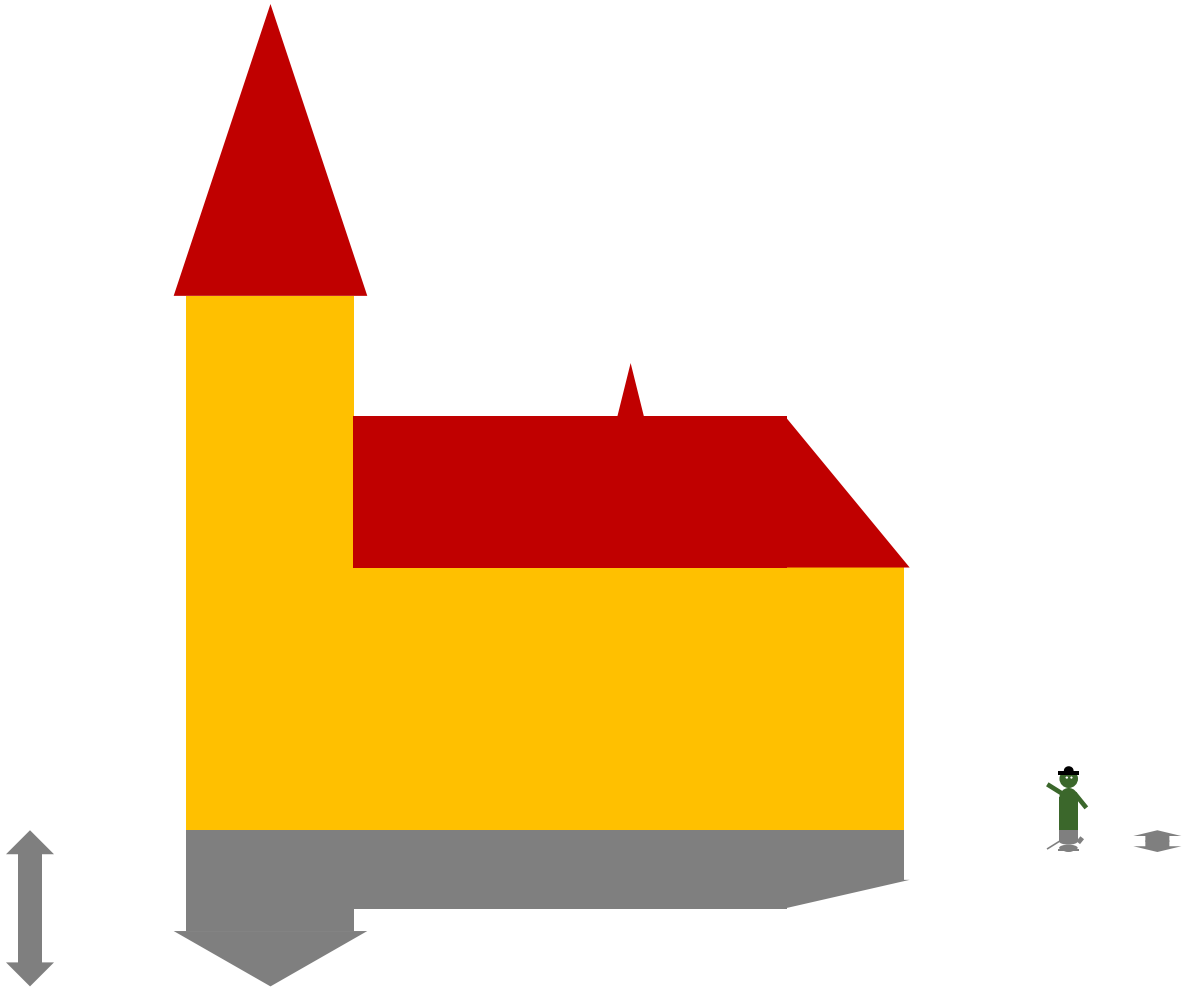
MEGA

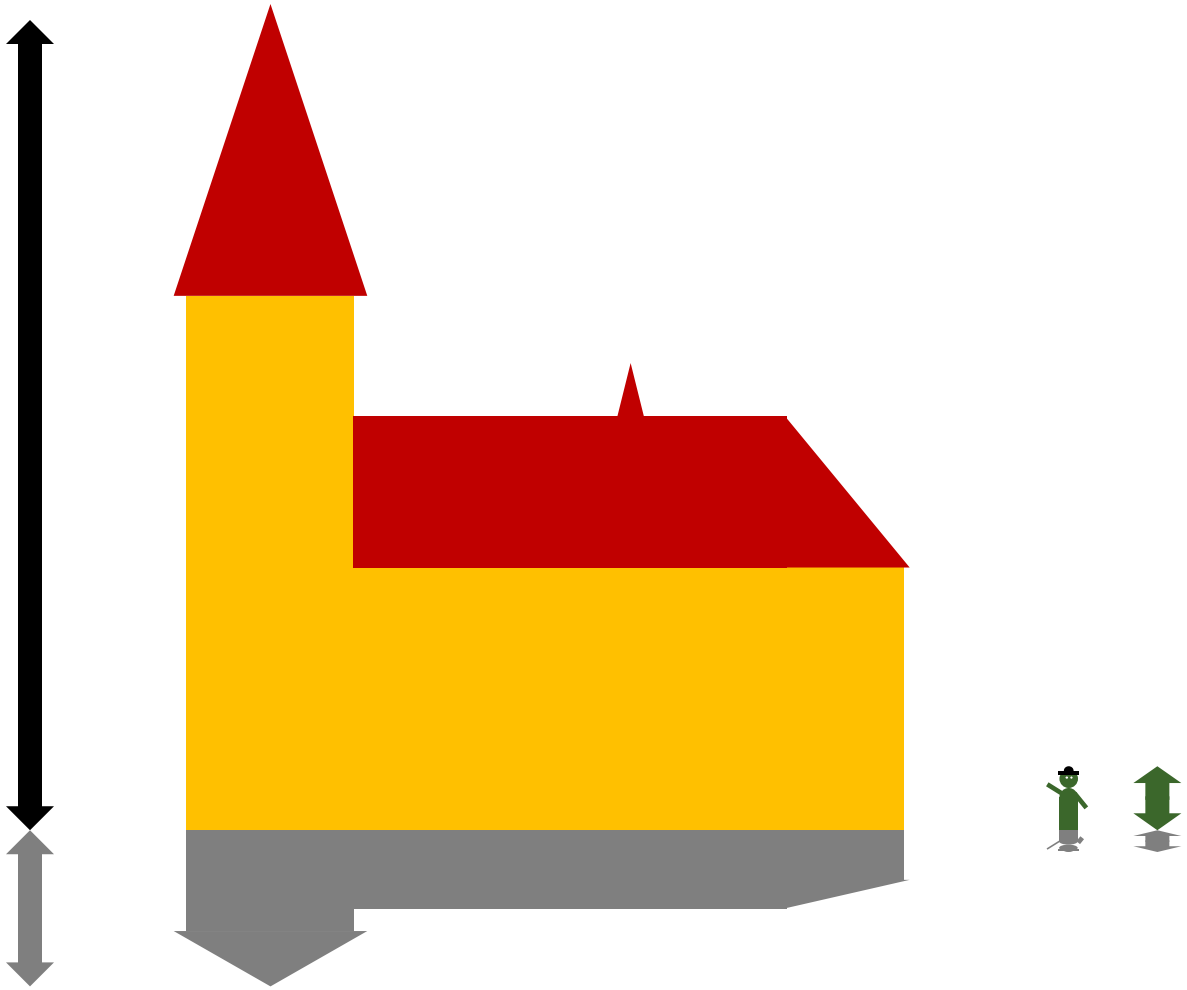
Kde si bol, keď som
kládol základy zeme?
Kto určil jej rozmery?







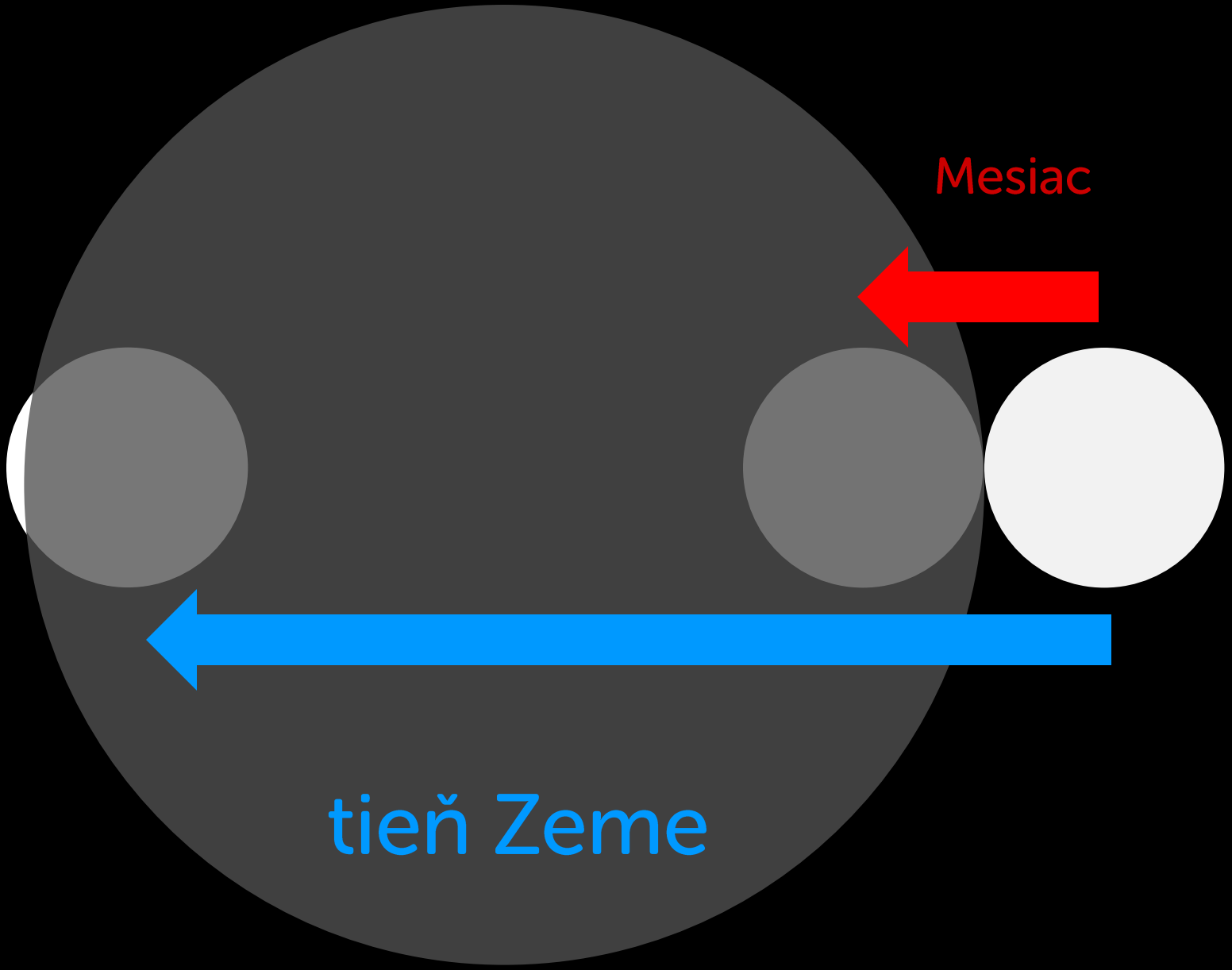


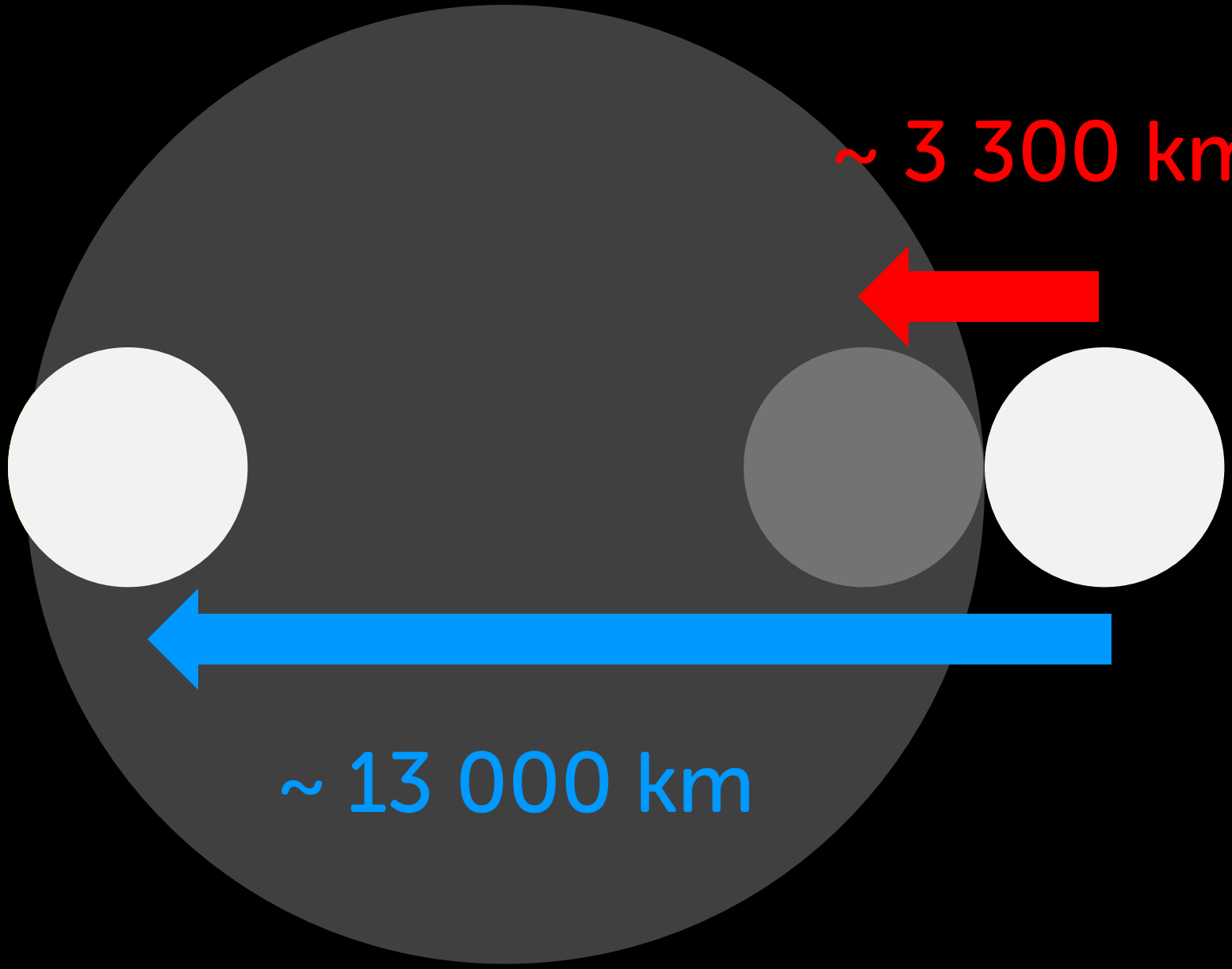


Aký veľký je Mesiac?

zatmenie Mesiaca


tieň Zeme

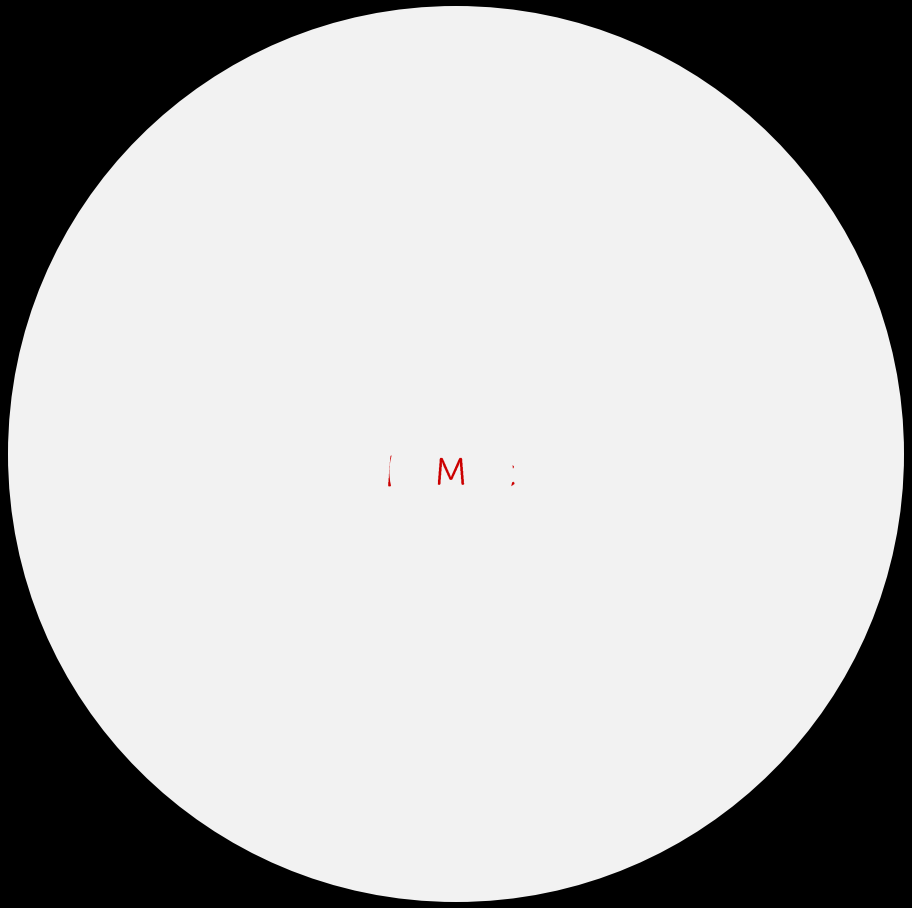

Mesiac
tieň Zeme


~ 3 300 km
~ 13 000 km

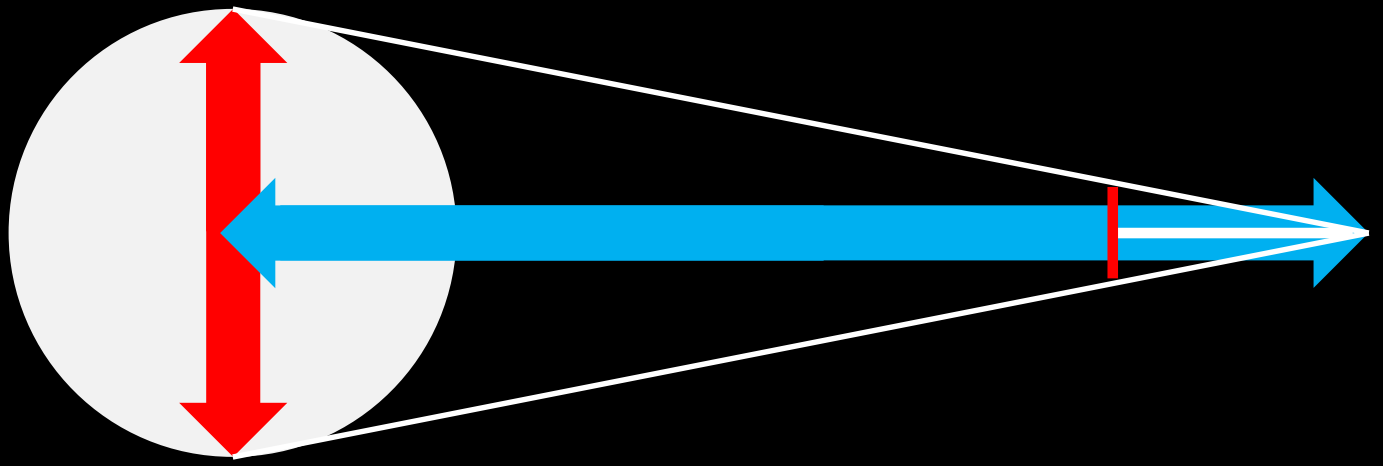
[NASA]

Ako ďaleko je na Mesiac?

Ako ďaleko je na Zem?


M

1 : 100



~ 3 500 km
priemer
Mesiaca

~ 350 000 km
vzdialenosť
Mesiaca

Ako ďaleko je slnko?

Ako ďaleko sú hviezdy?


[Mashiko]

Friedrich Bessel (1838)

paralaxa 61 Cygni

11.4 svetelných rokov

100 000 000
000 000 km

Slnko 150 000 000 km = 8.3 lym
Proxima Centauri 4.2 lyr

Hviezdy sú ďaleko!

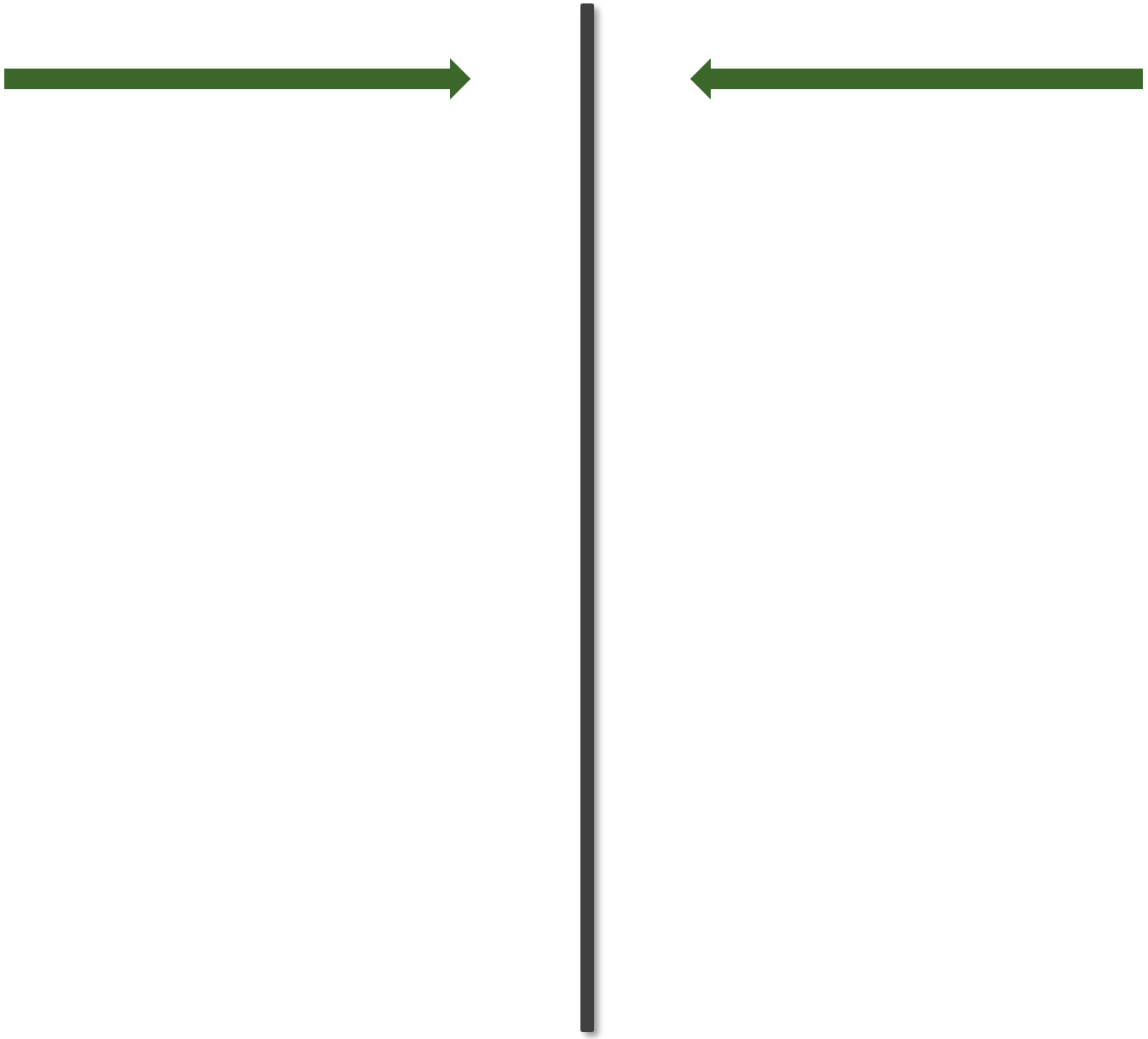

Large Magellanic Cloud [NASA]

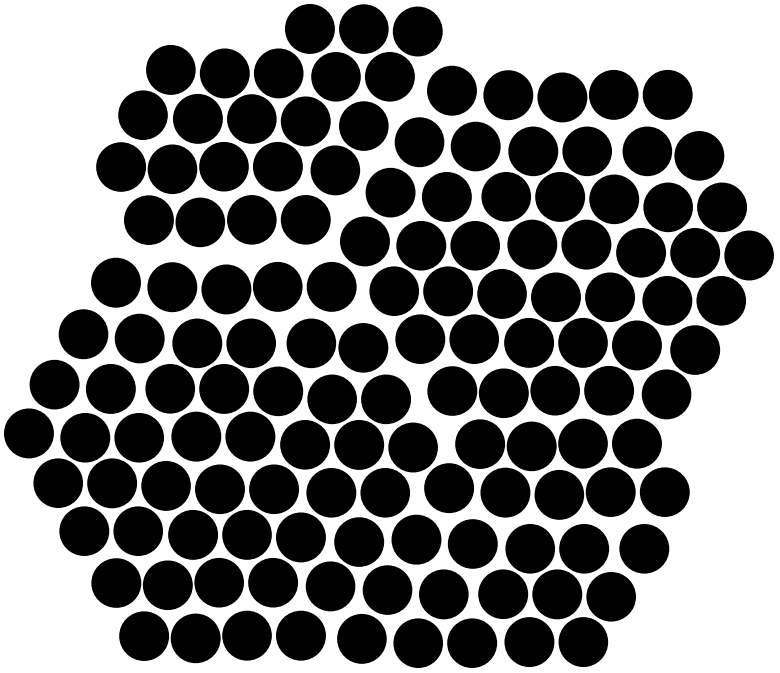
Large Magellanic Cloud [NASA]

[Atacama Large Milimeter/submilimeter Array, ESO/C.Malin]

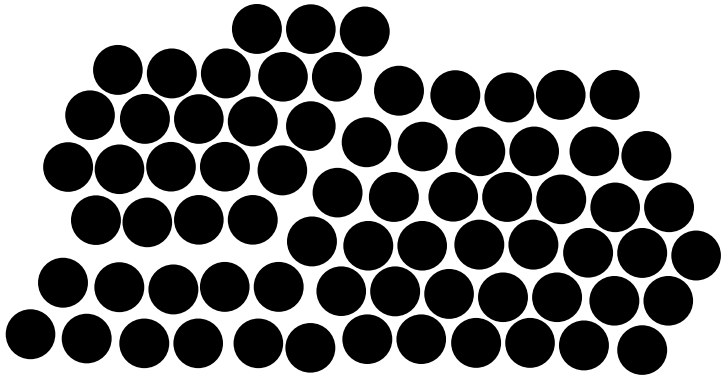
- mini

Prach si a na
prach sa obrátiš.

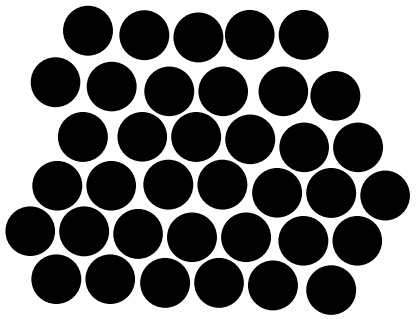




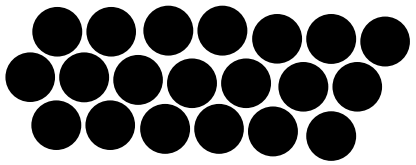
$2\ cm^2$



$$\frac{2\ \text{cm}^2}{2}$$



$$\frac{2\ \text{cm}^2}{2 \times 2}$$



$$\frac{2\ \text{cm}^2}{2\times2\times2}$$

$$\frac{2\ \text{cm}^2}{2^{14}}$$

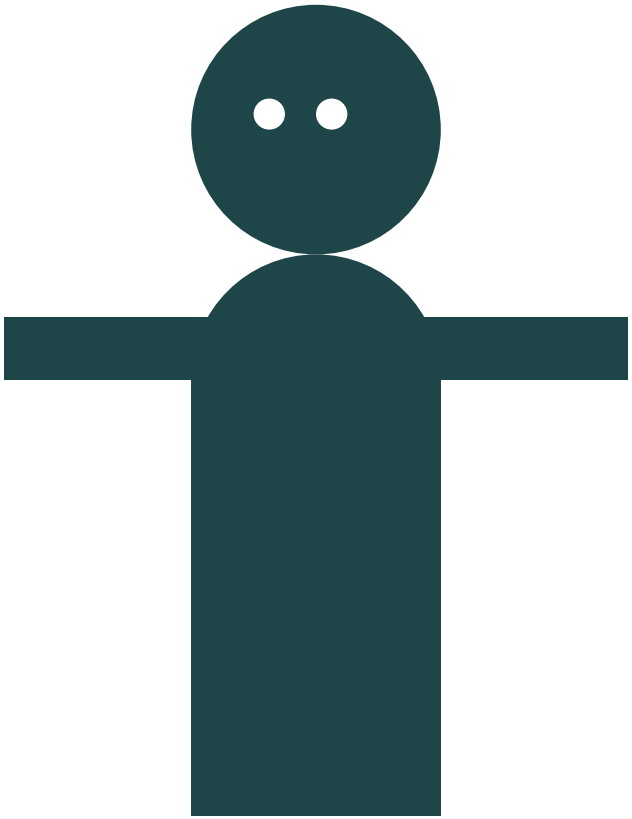
$0.012\ \text{cm}^2$

$\frac{2\ \text{cm}^2}{2^{14}}$

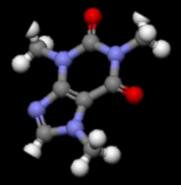
0.06 mm

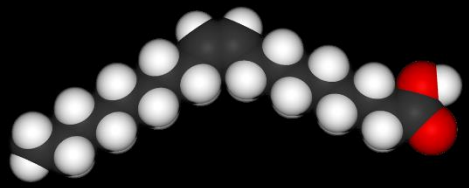
$0.012\ cm^2$

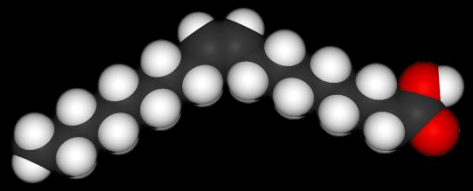
$$\frac{2\ cm^2}{2^{14}}$$



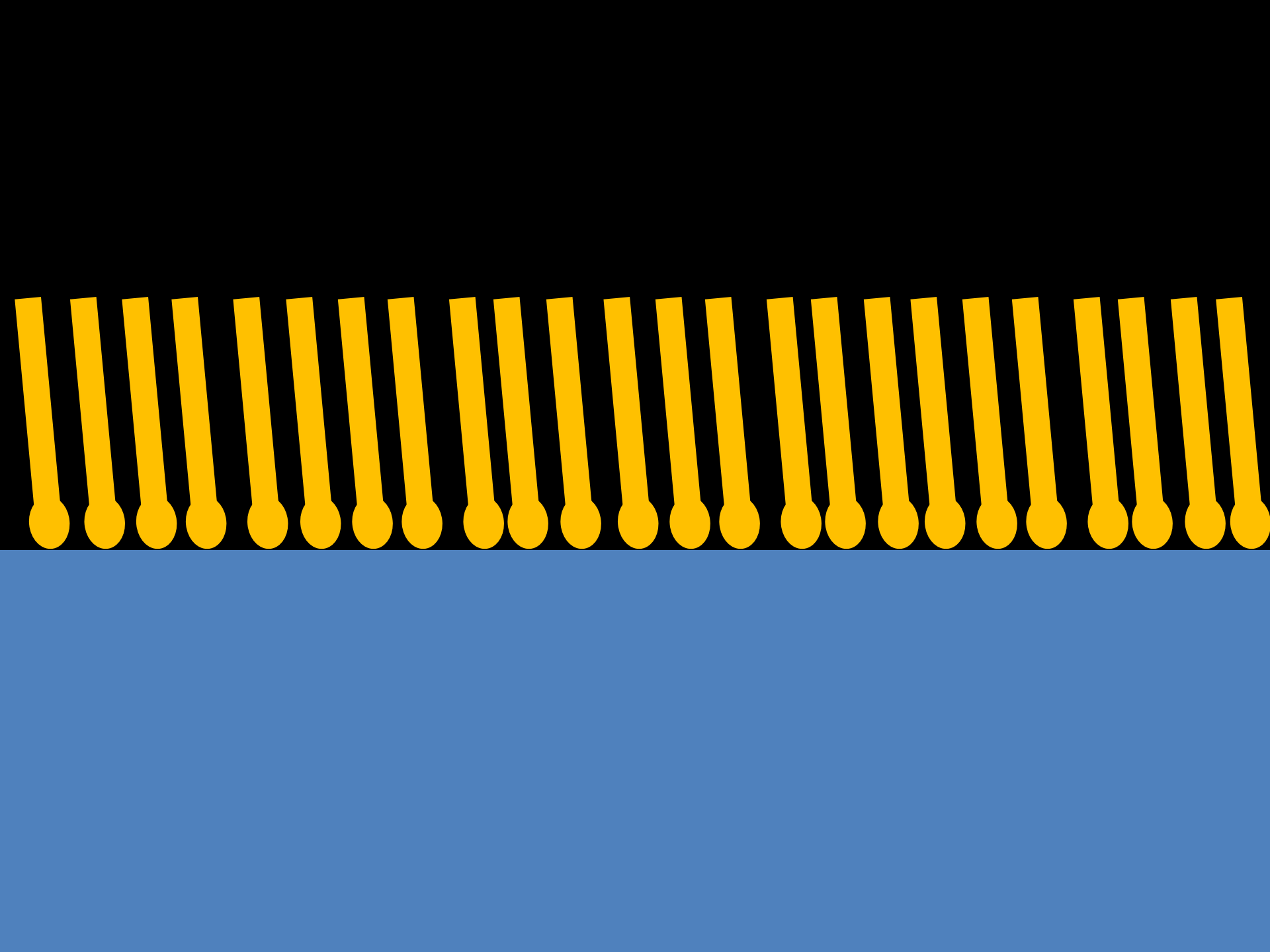
Aké malé sú molekuly?

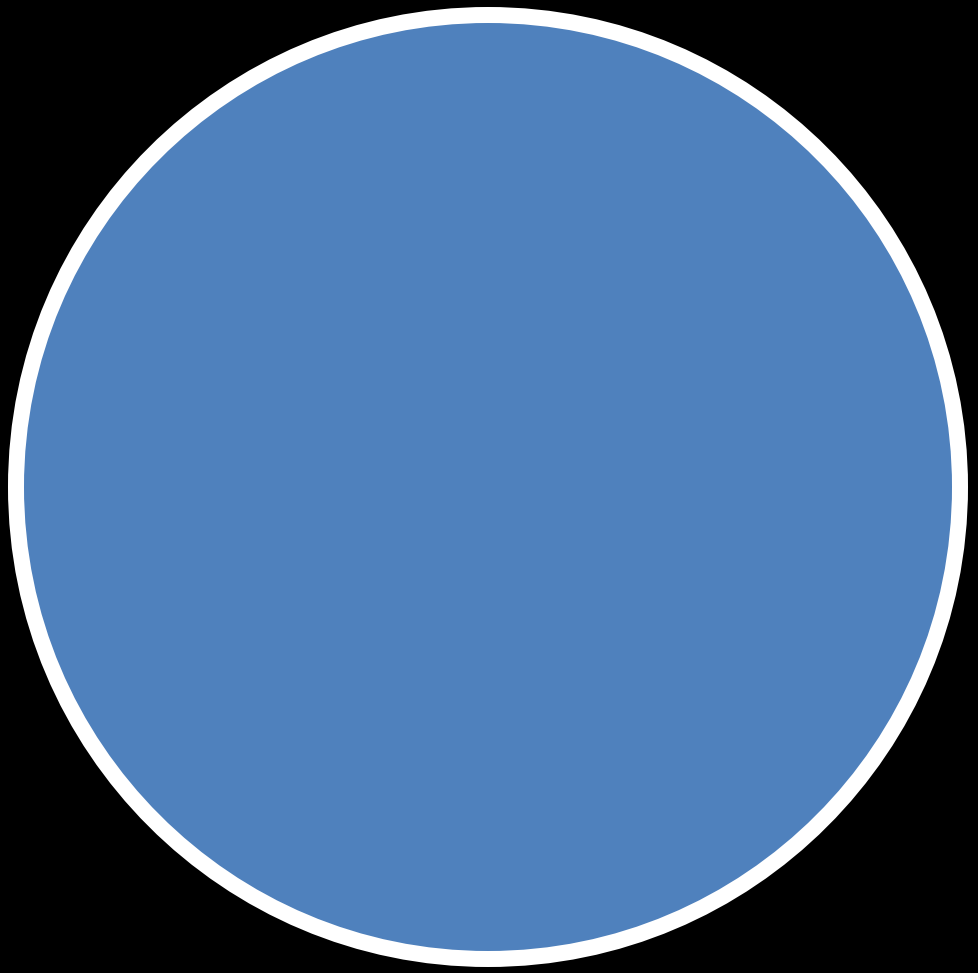


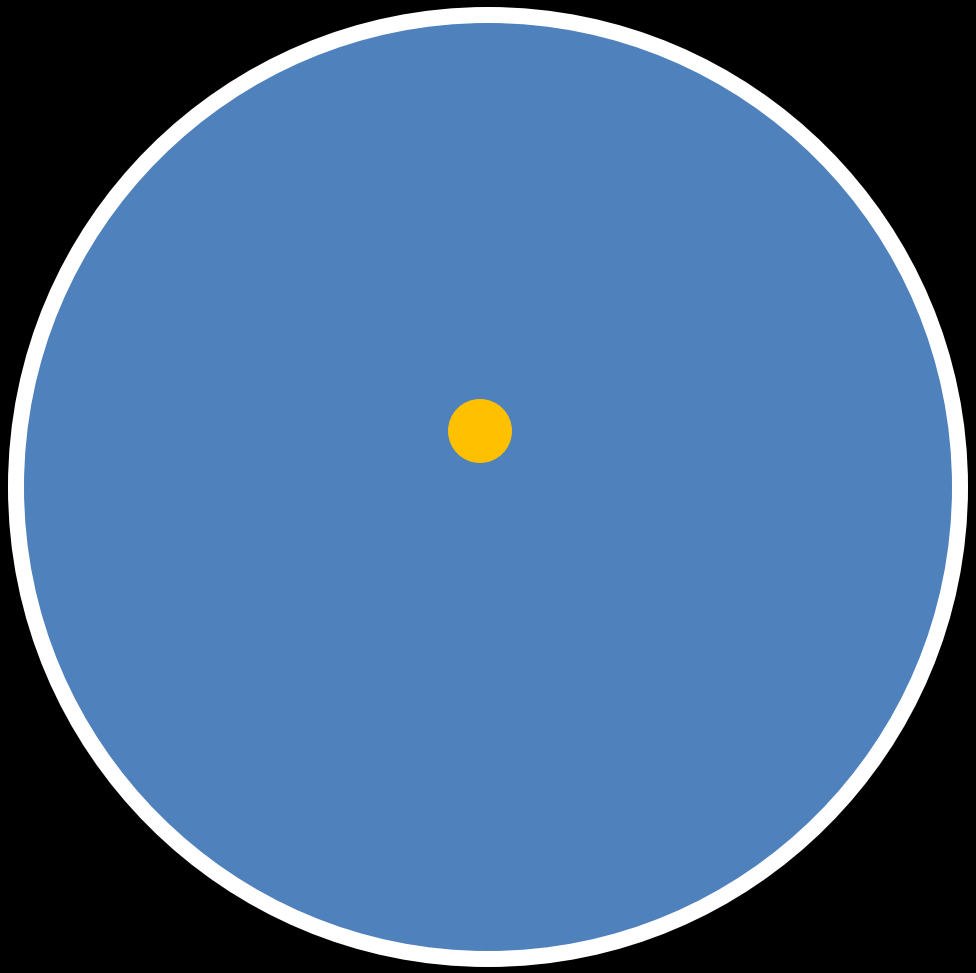


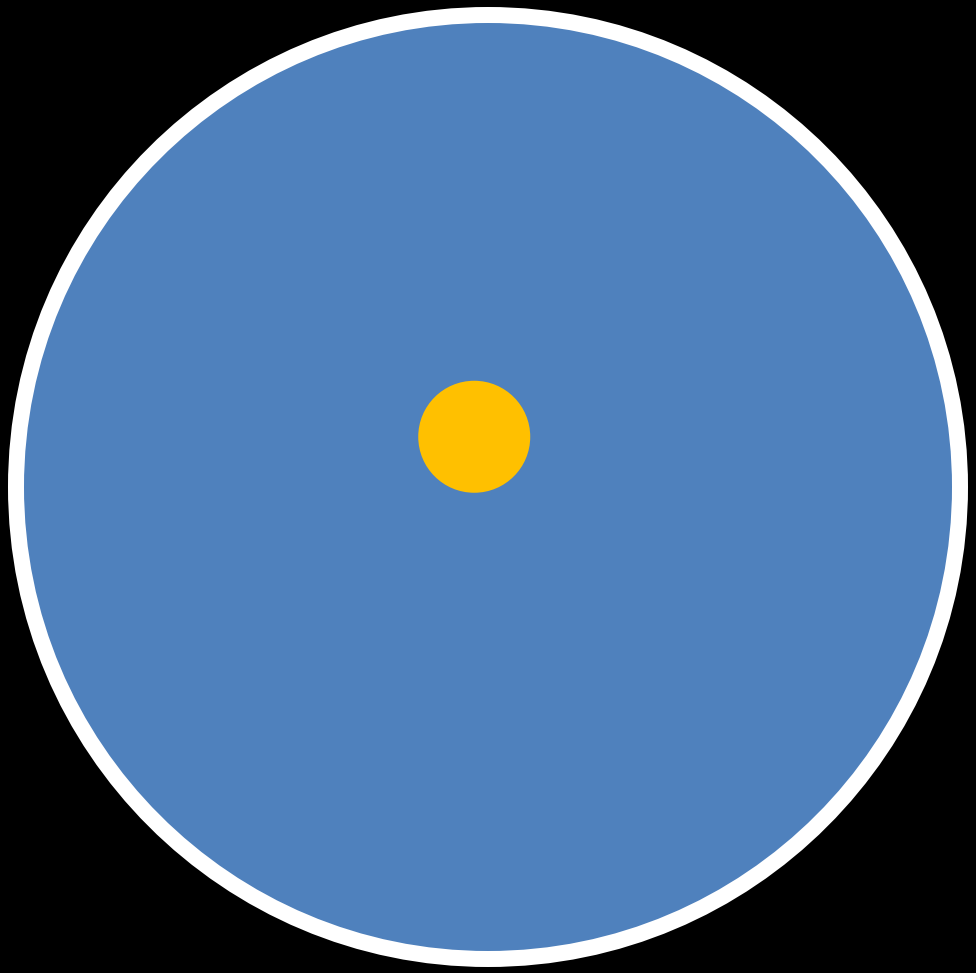


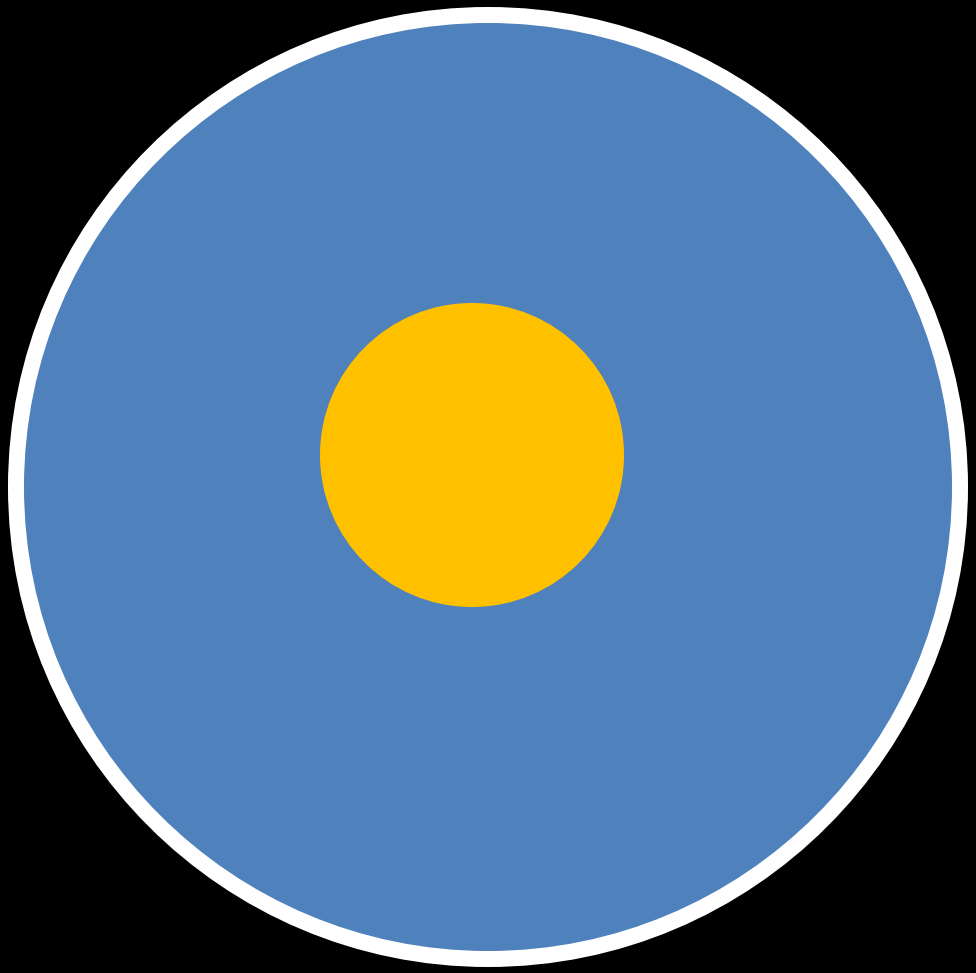
kyselina
olejová

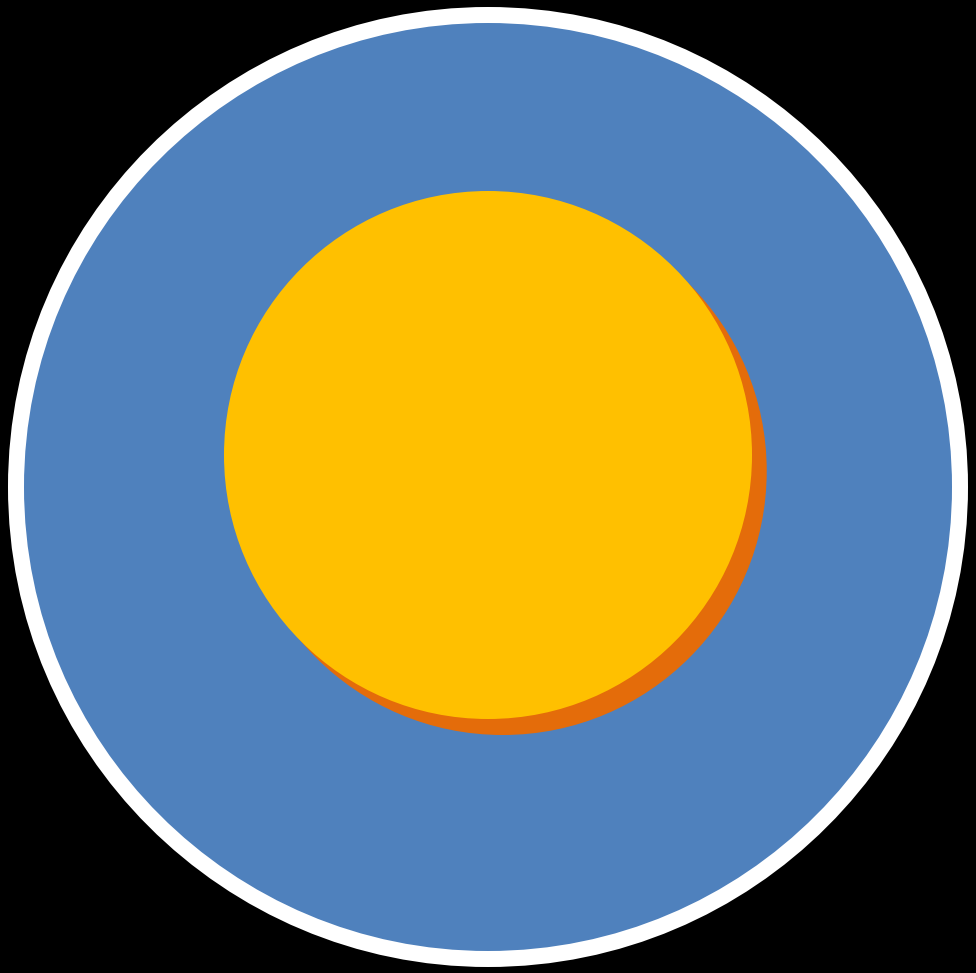


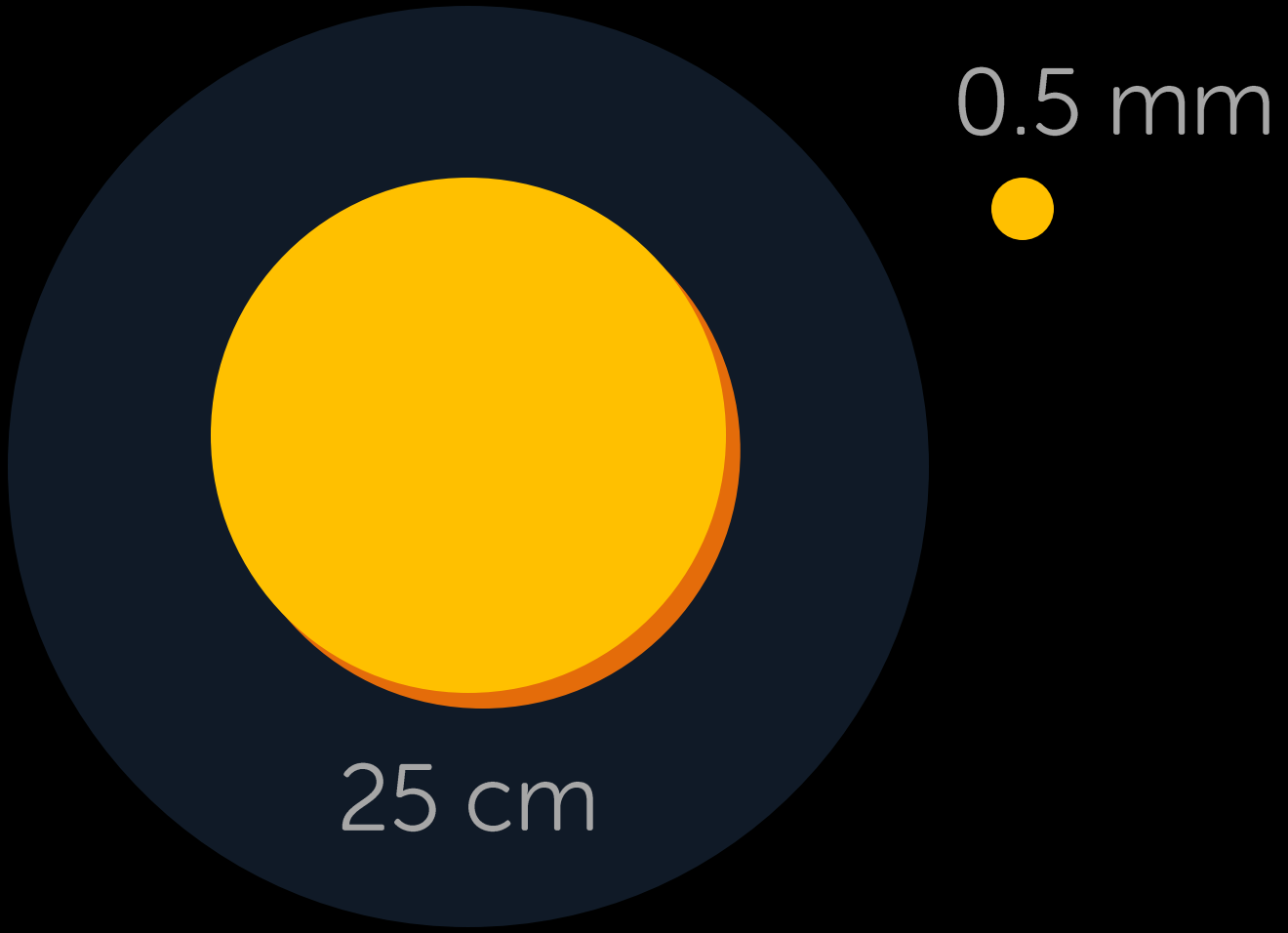




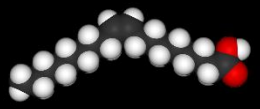




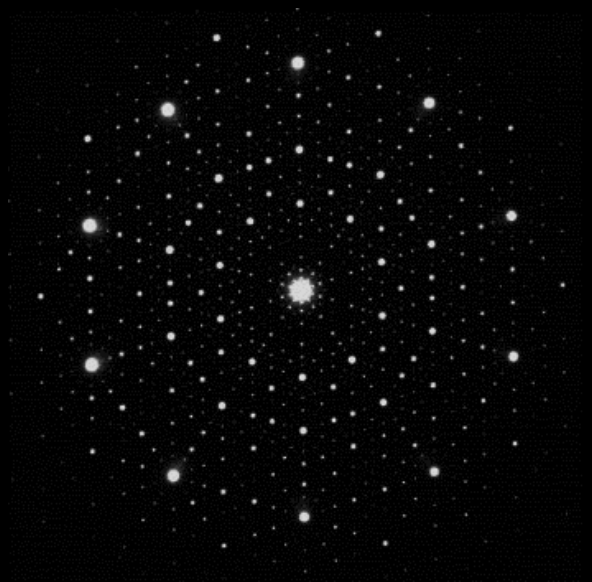


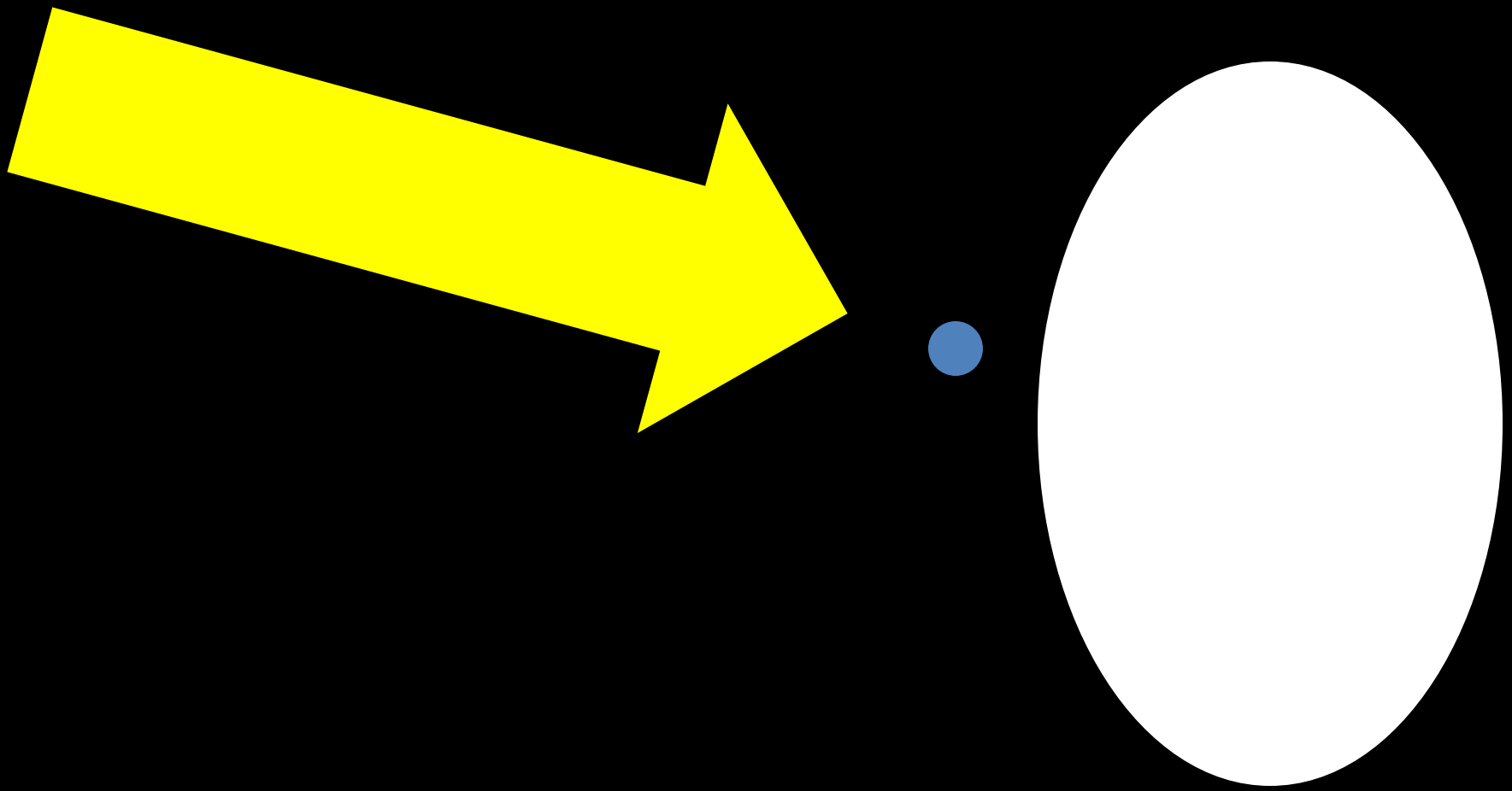

0.5 mm
25 cm

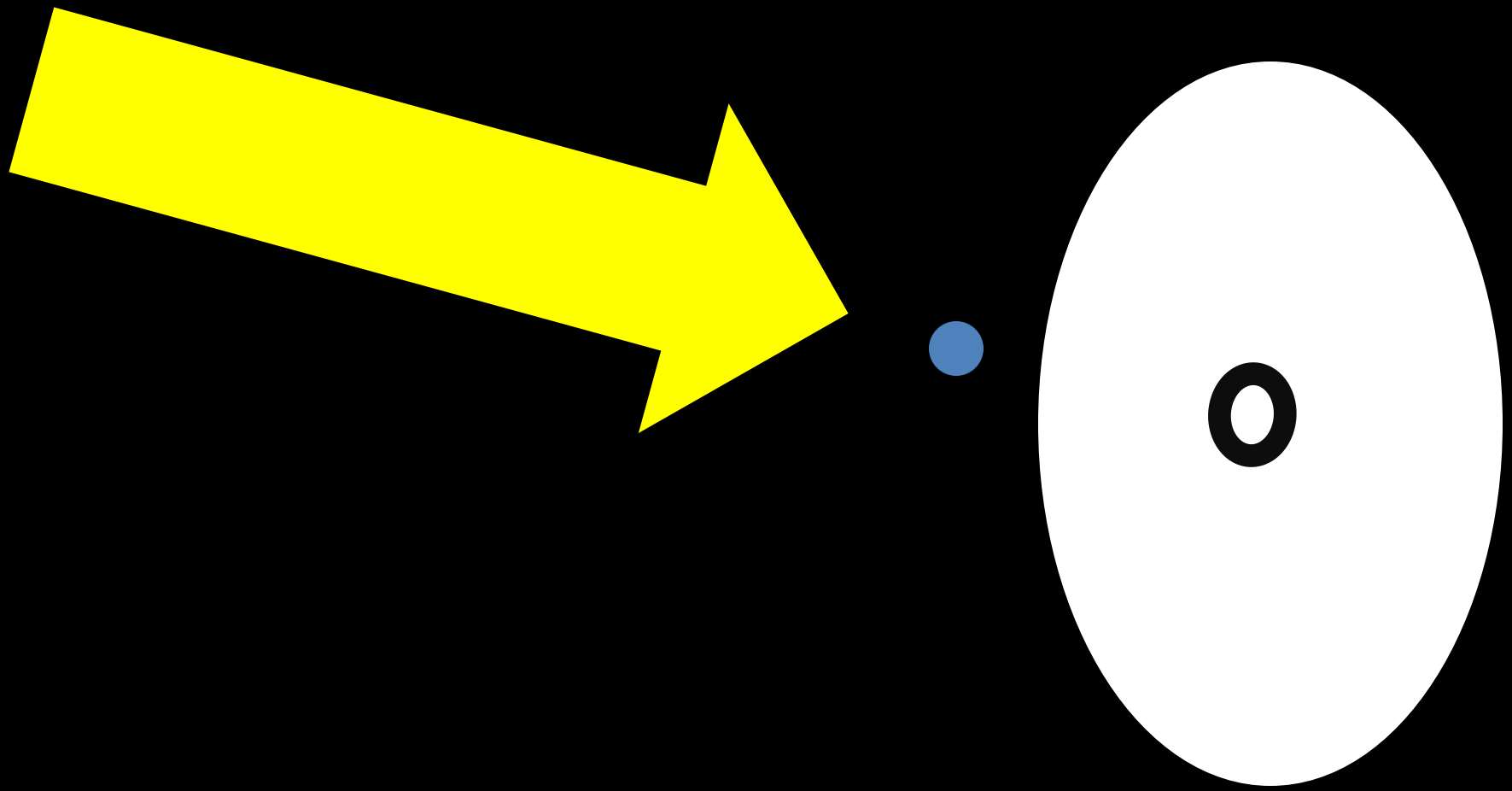
10^{-9} m



rovnaký objem

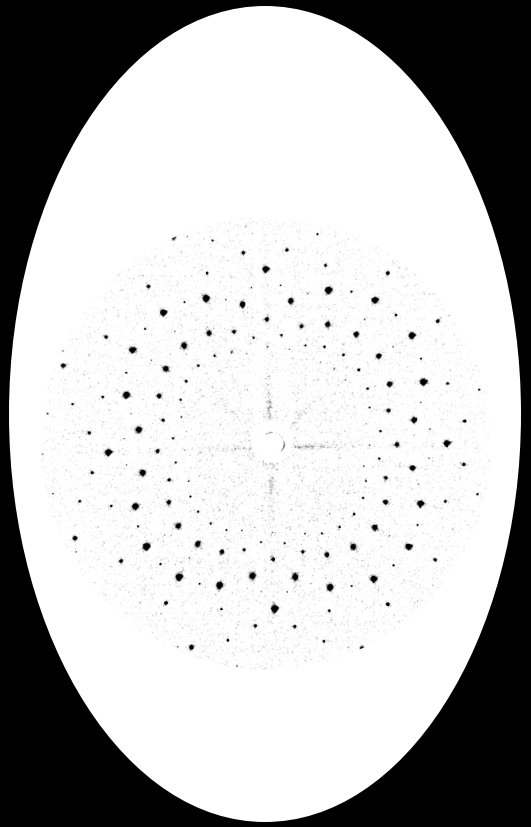


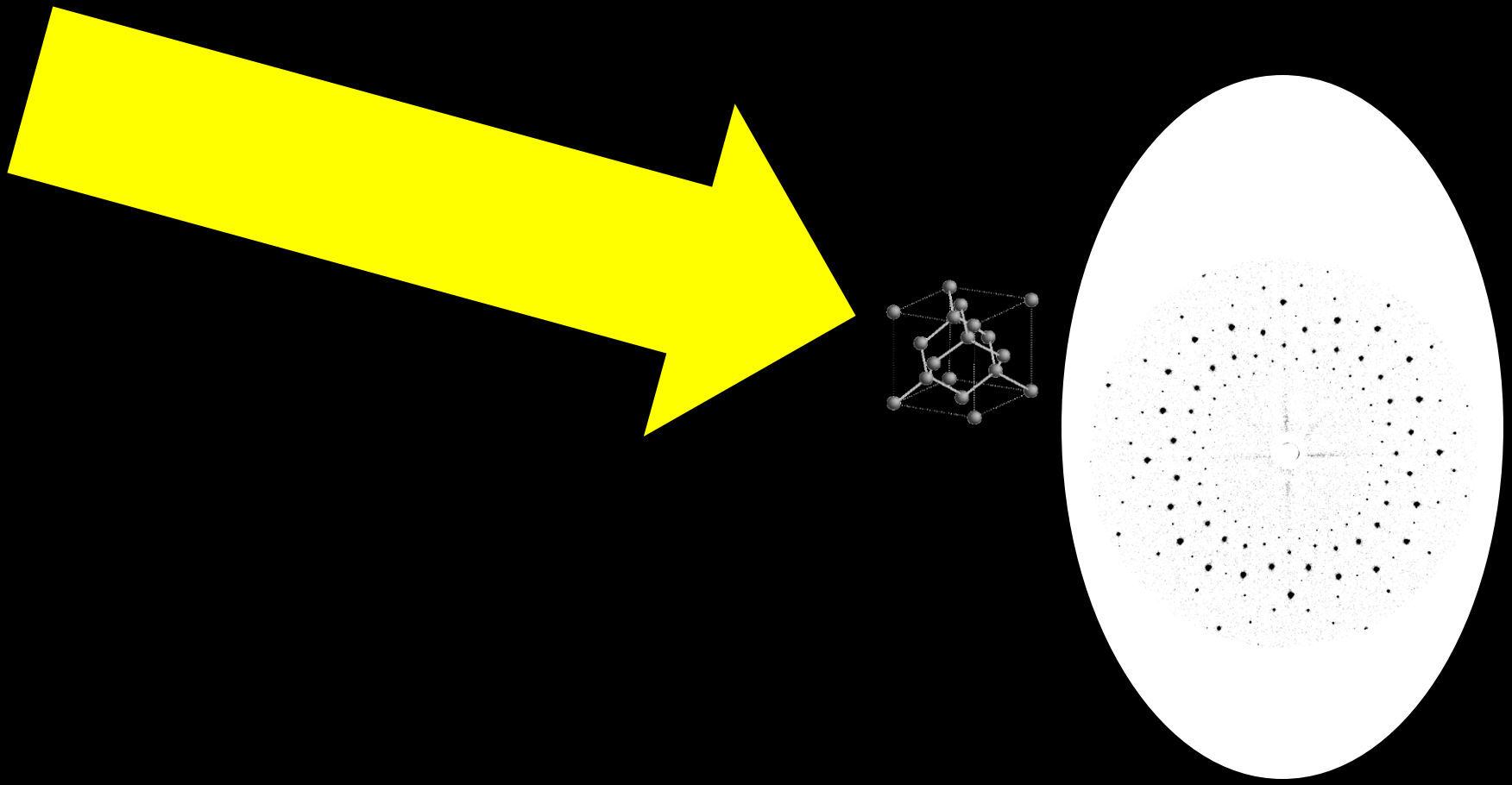


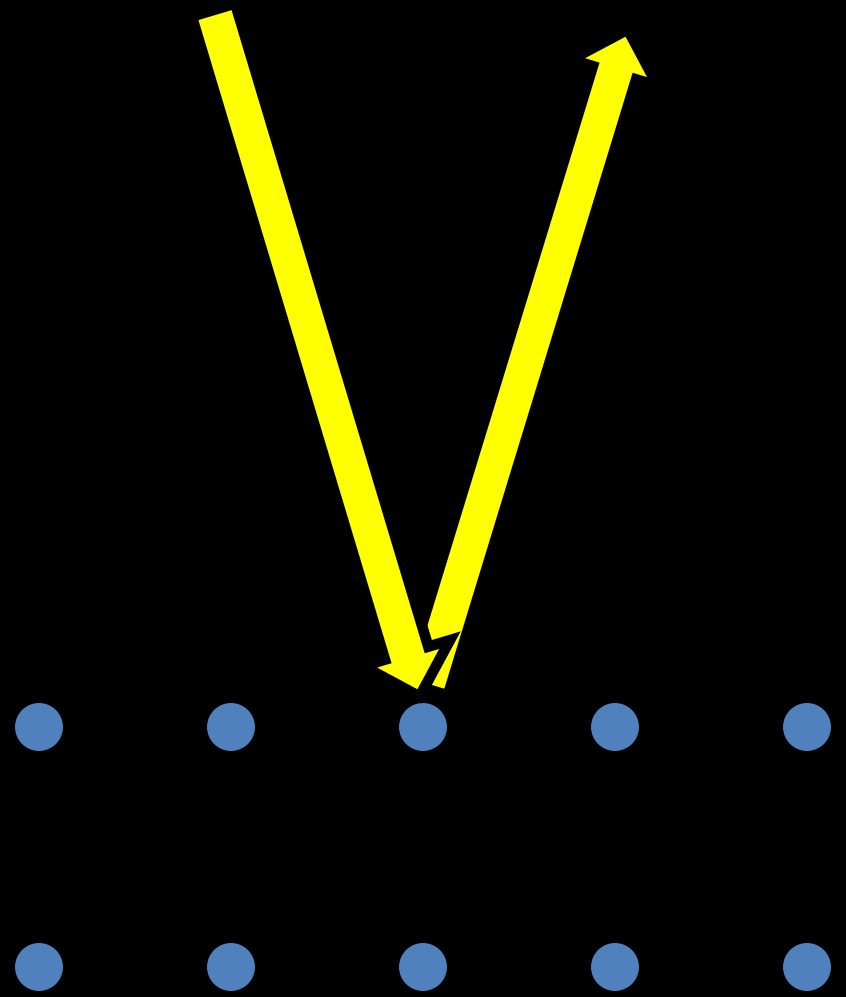

o

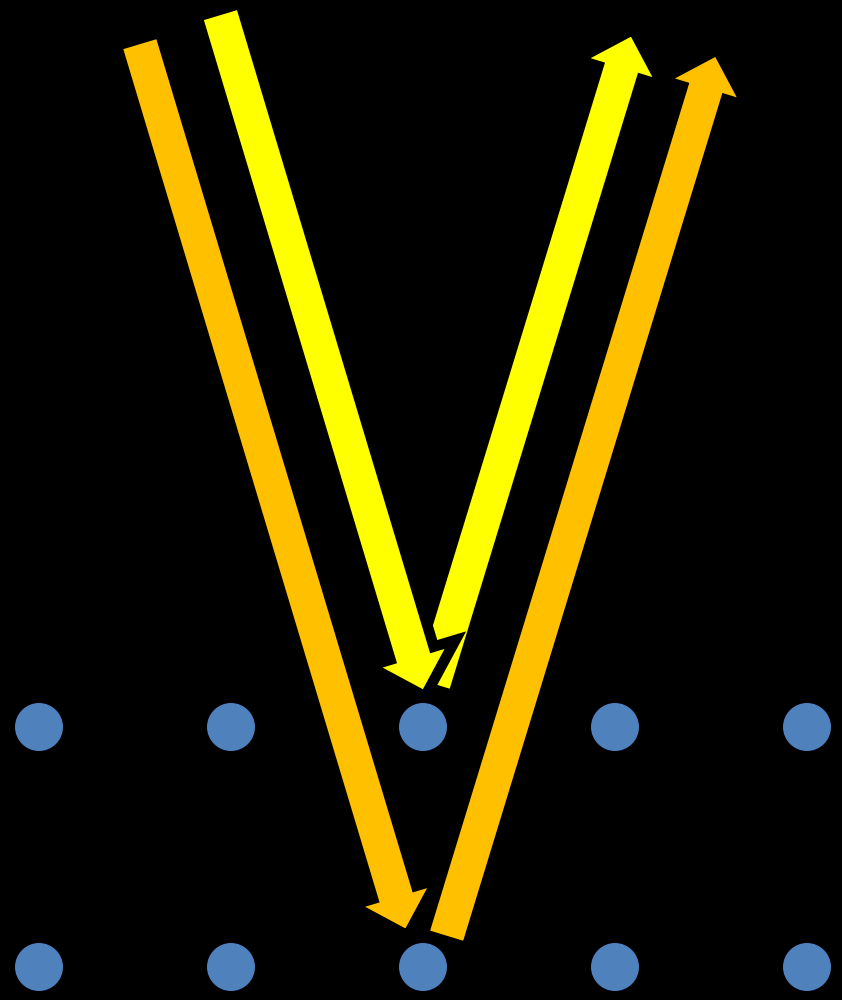
X

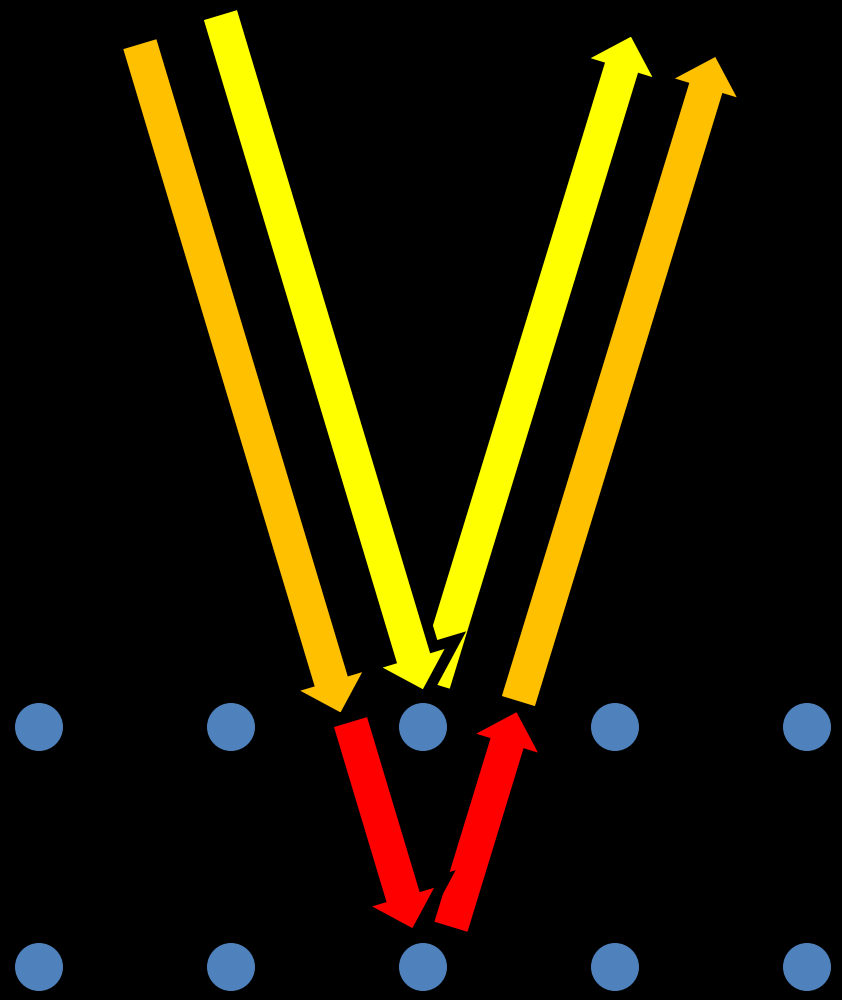
kryštál

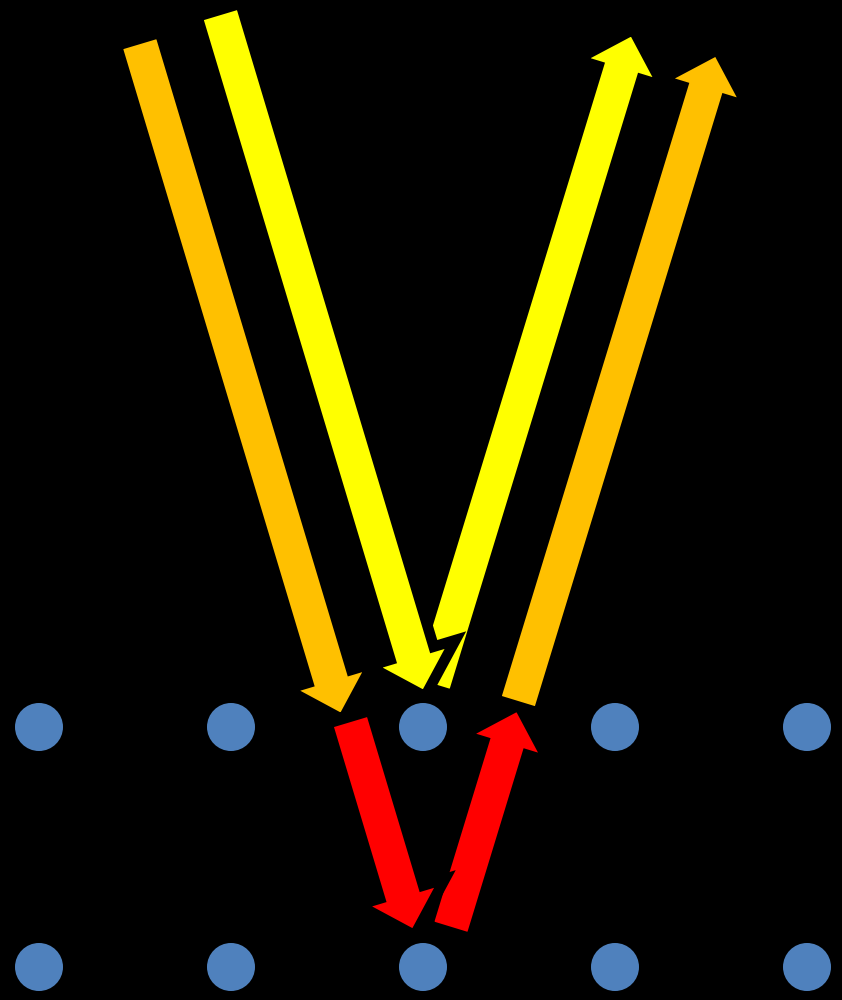




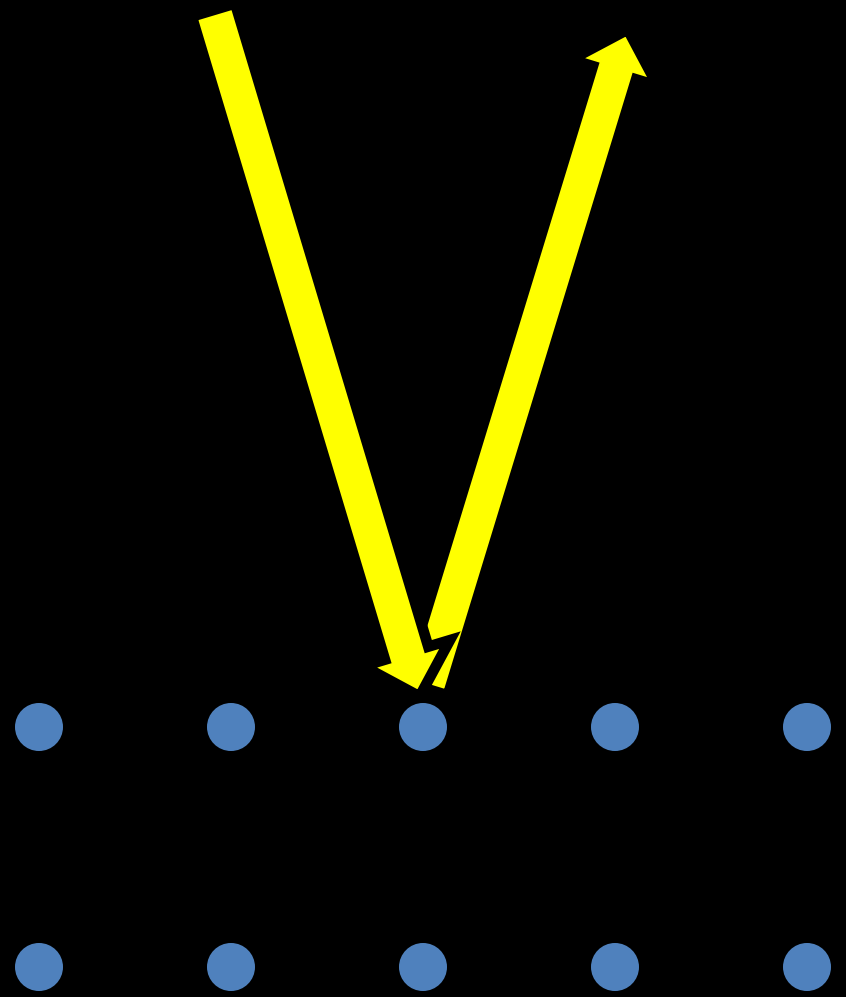


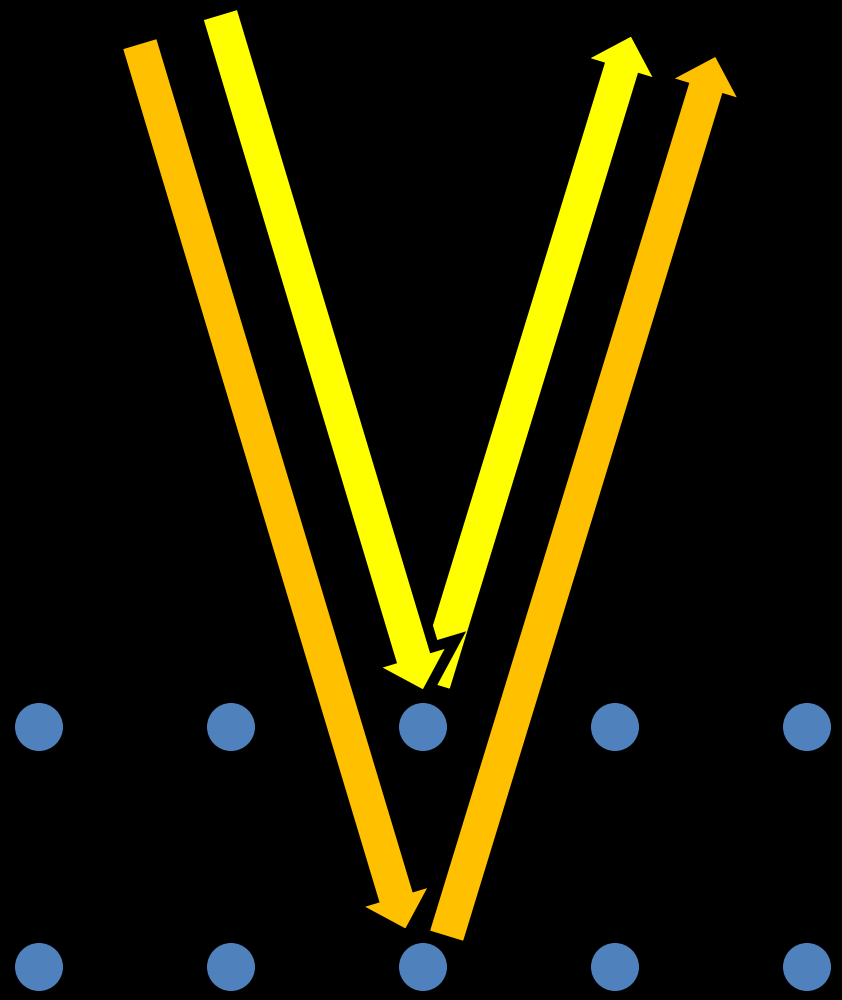


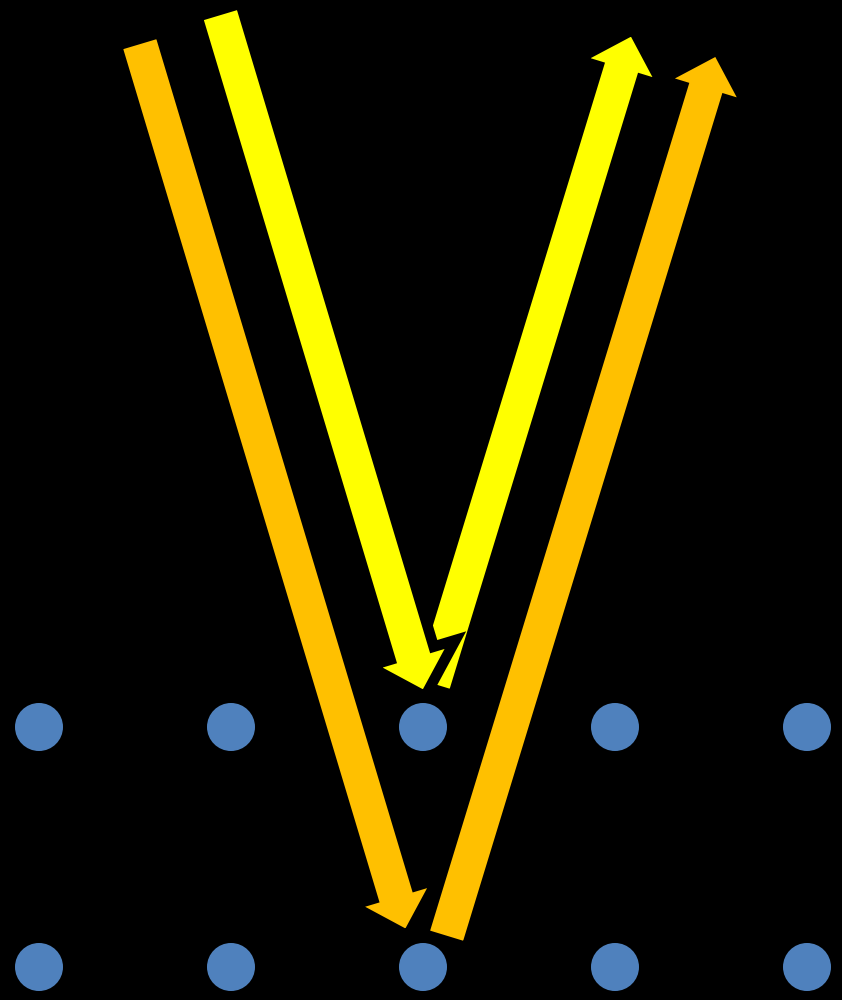


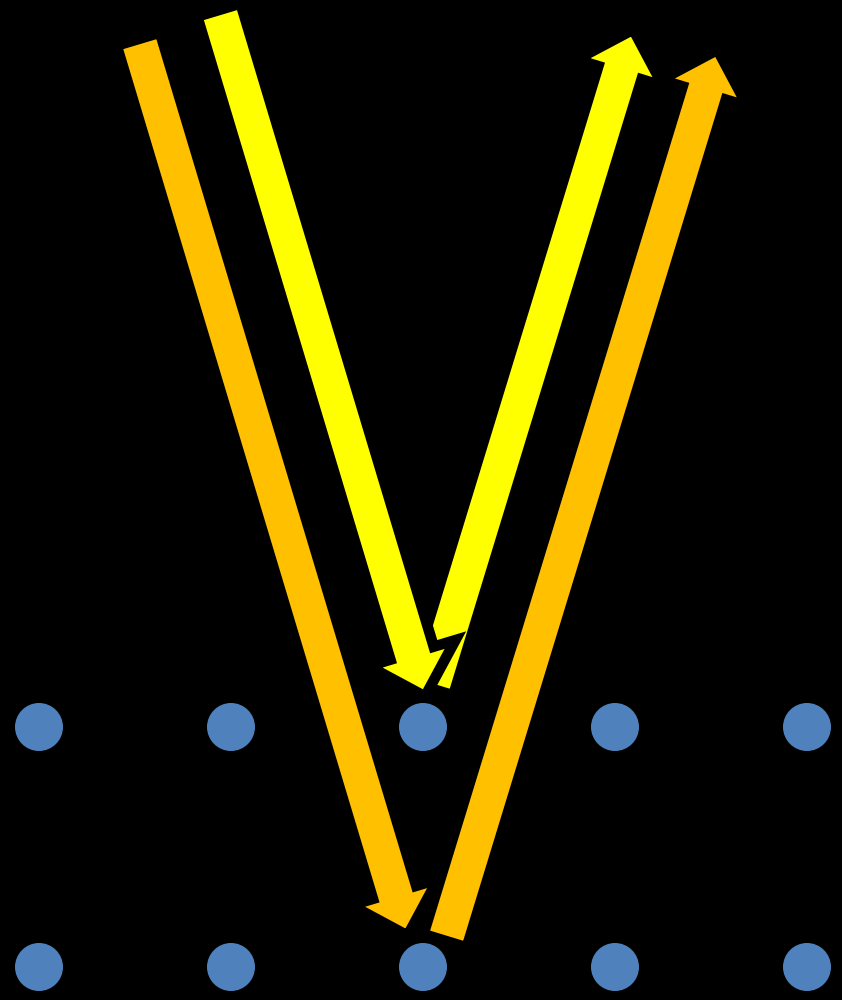


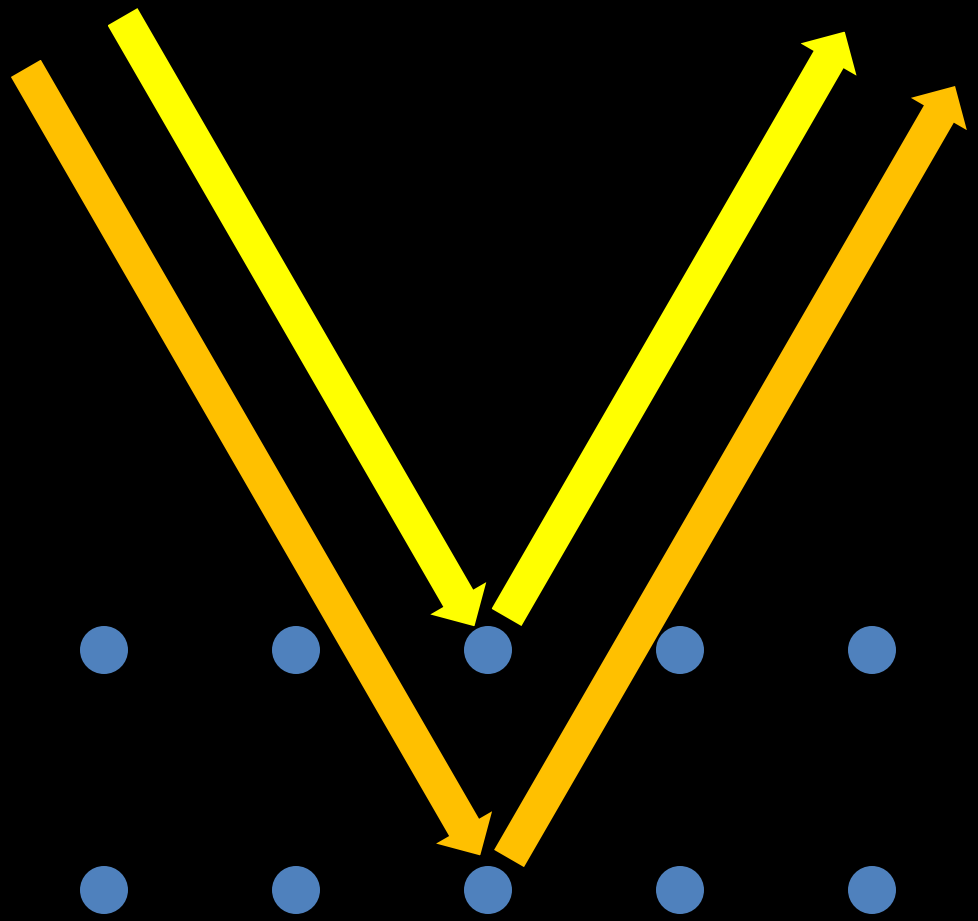
difrakcia







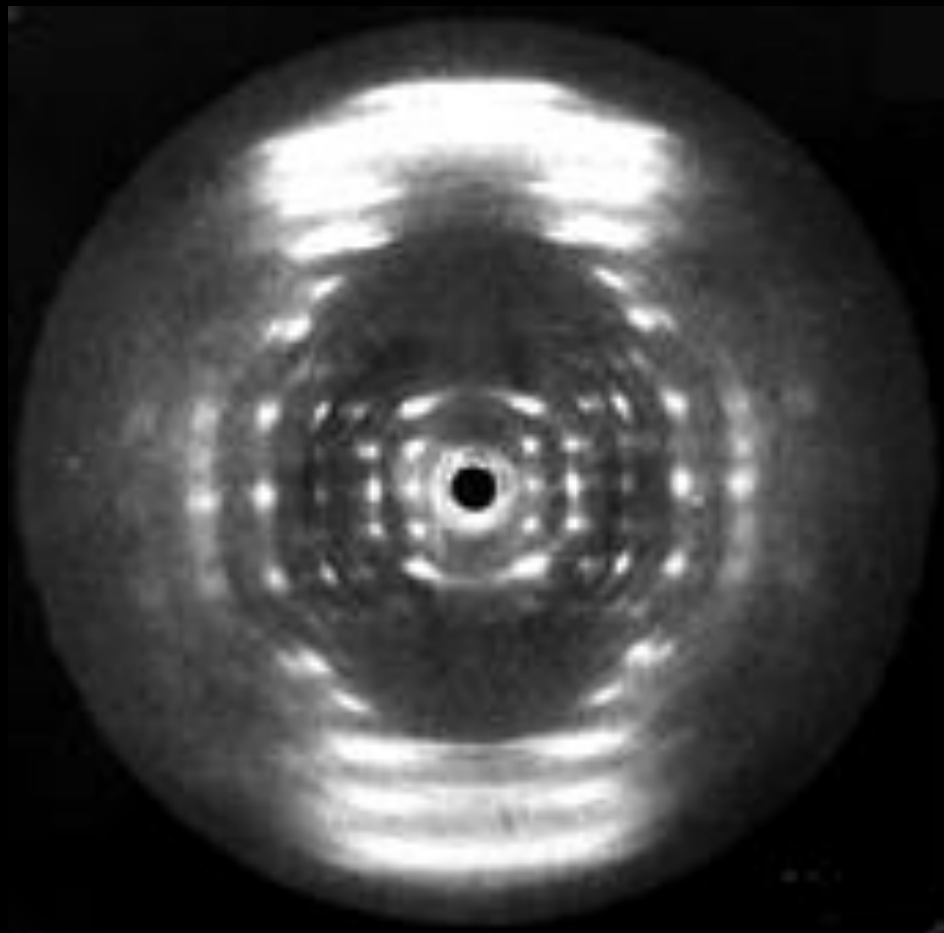


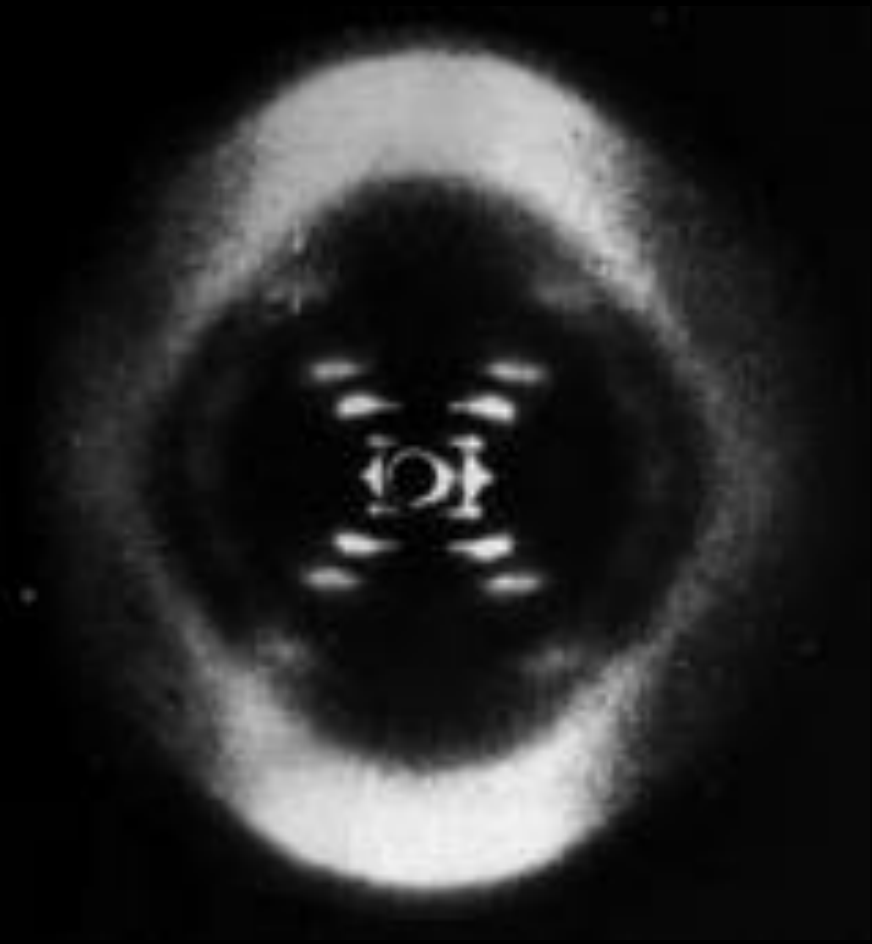


NaCl

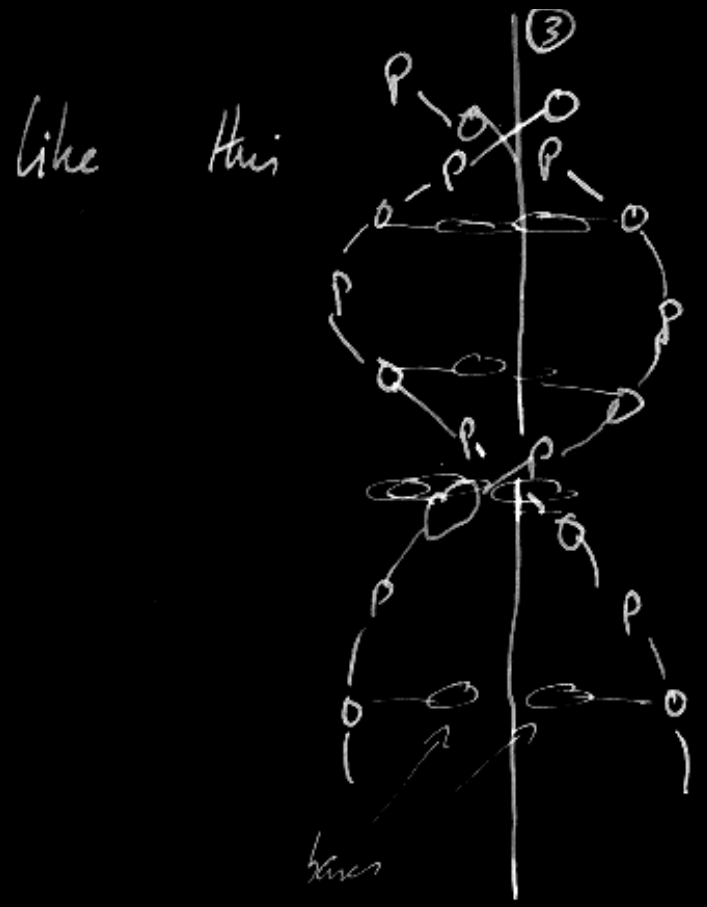
štruktúra

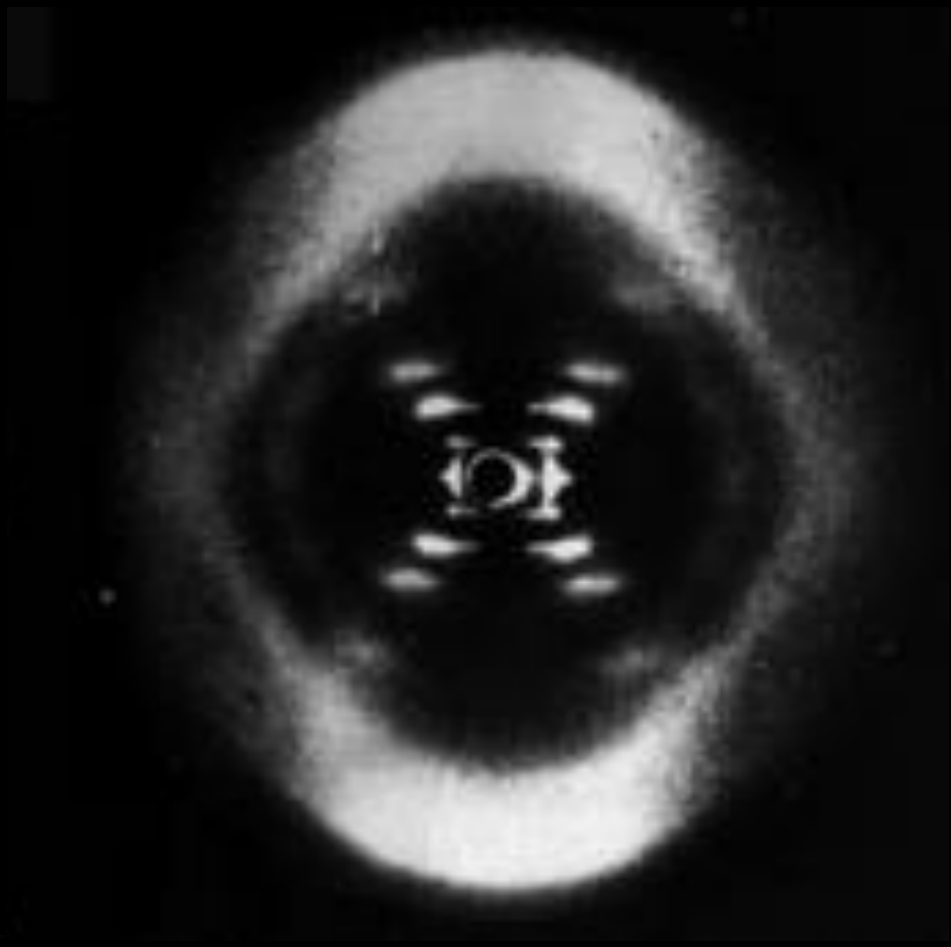
DNA





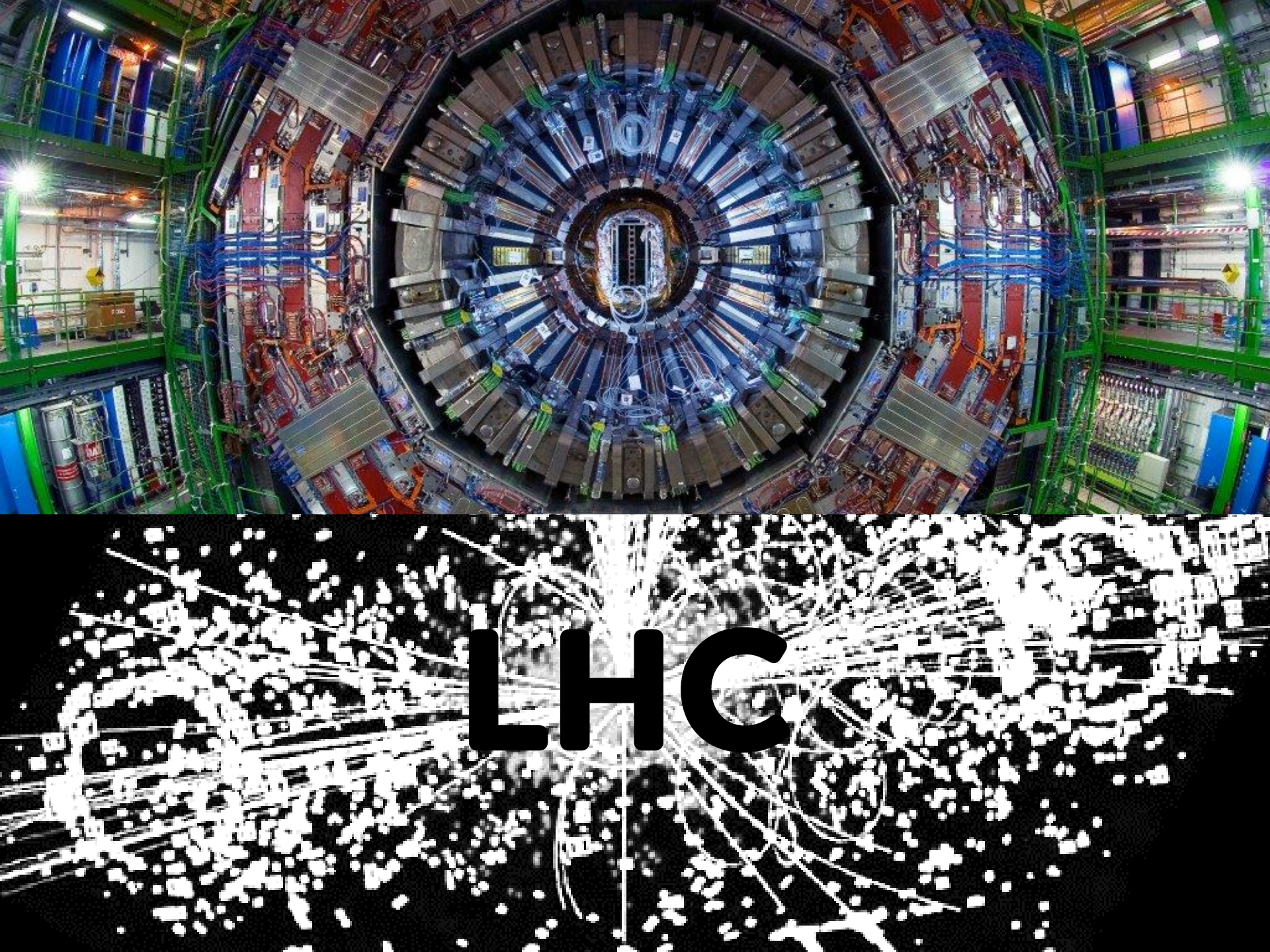
Rosalind Franklin (1952)





Rosalind Franklin (1952)

Watson & Crick

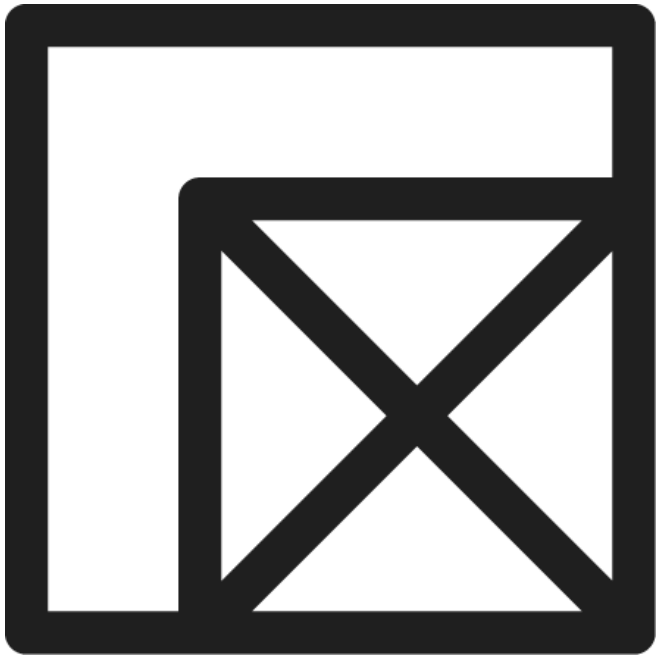

LHC

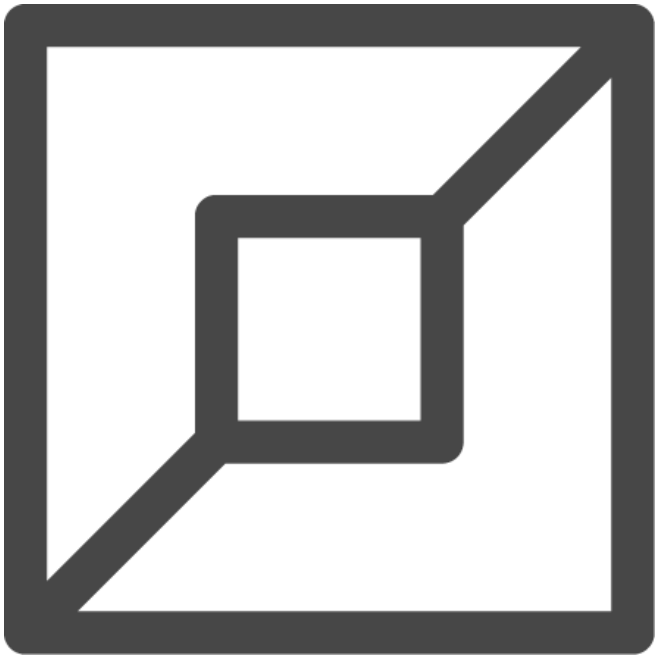
počíta

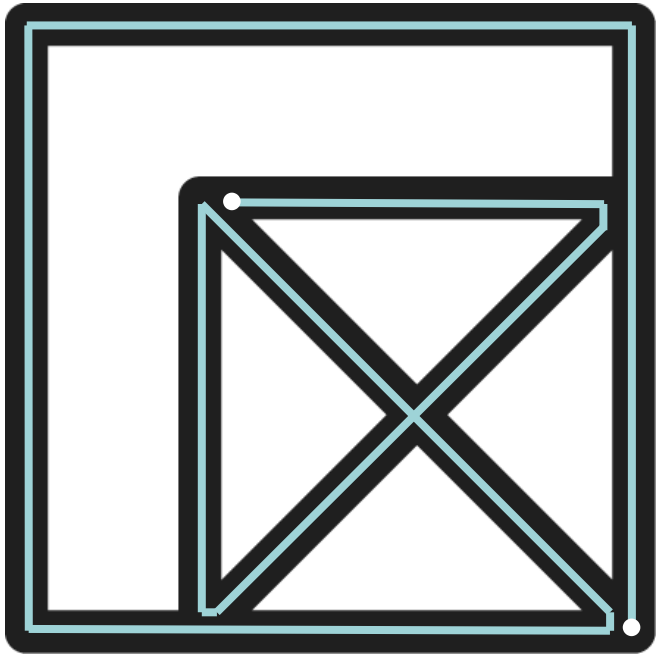
na kvantových počítačoch, ktoré ešte nemáme

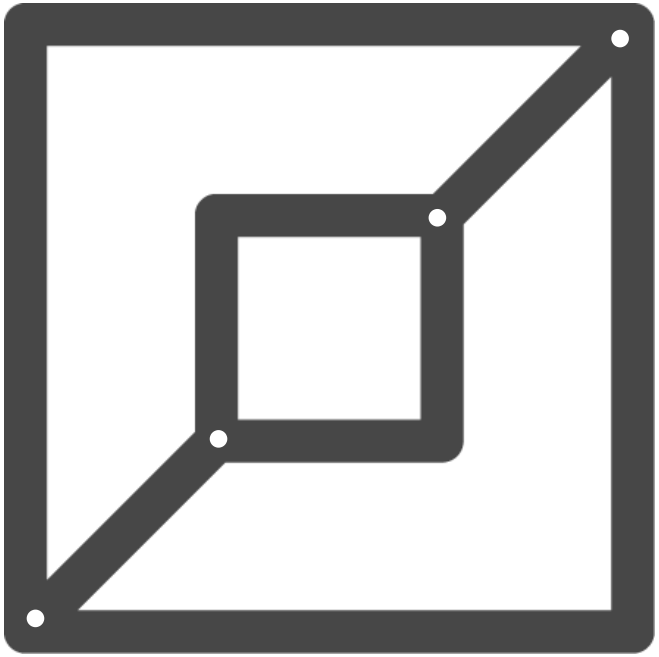
nie

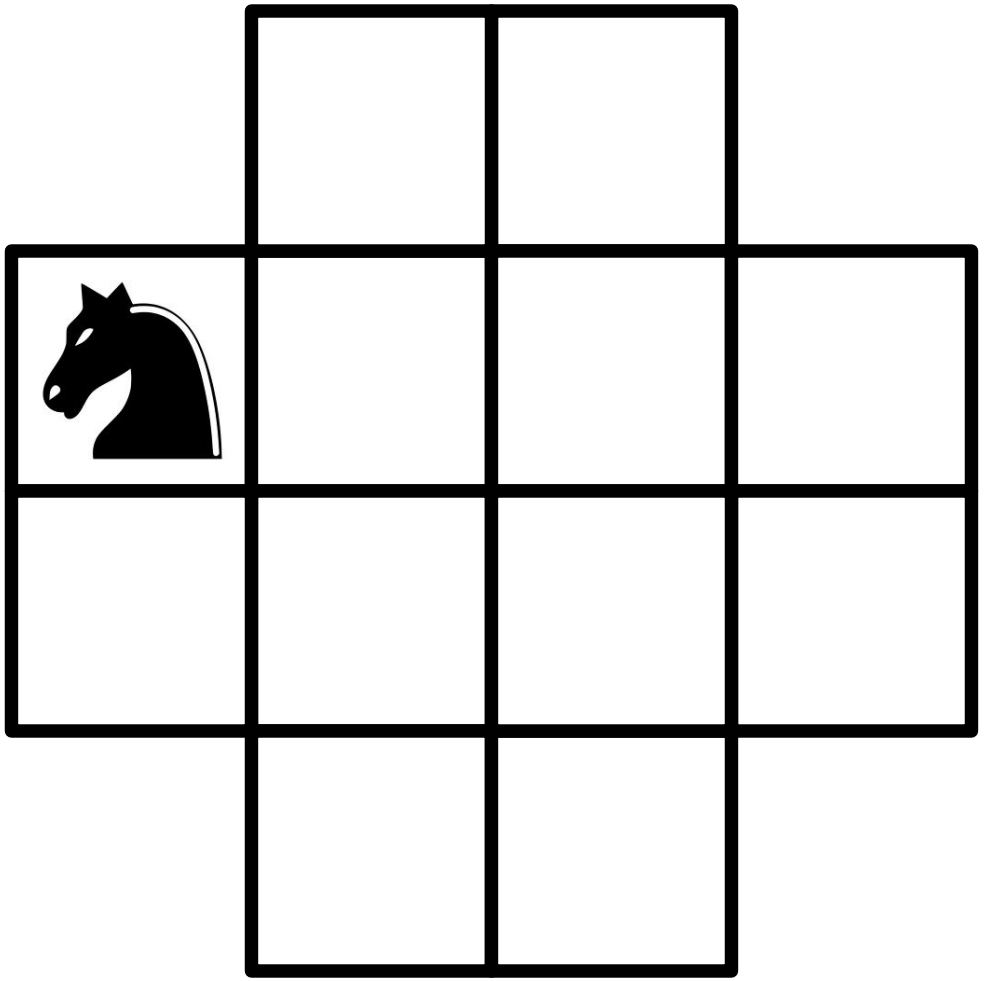
… a vám aj všetky vlasy
na hlave spočítal.

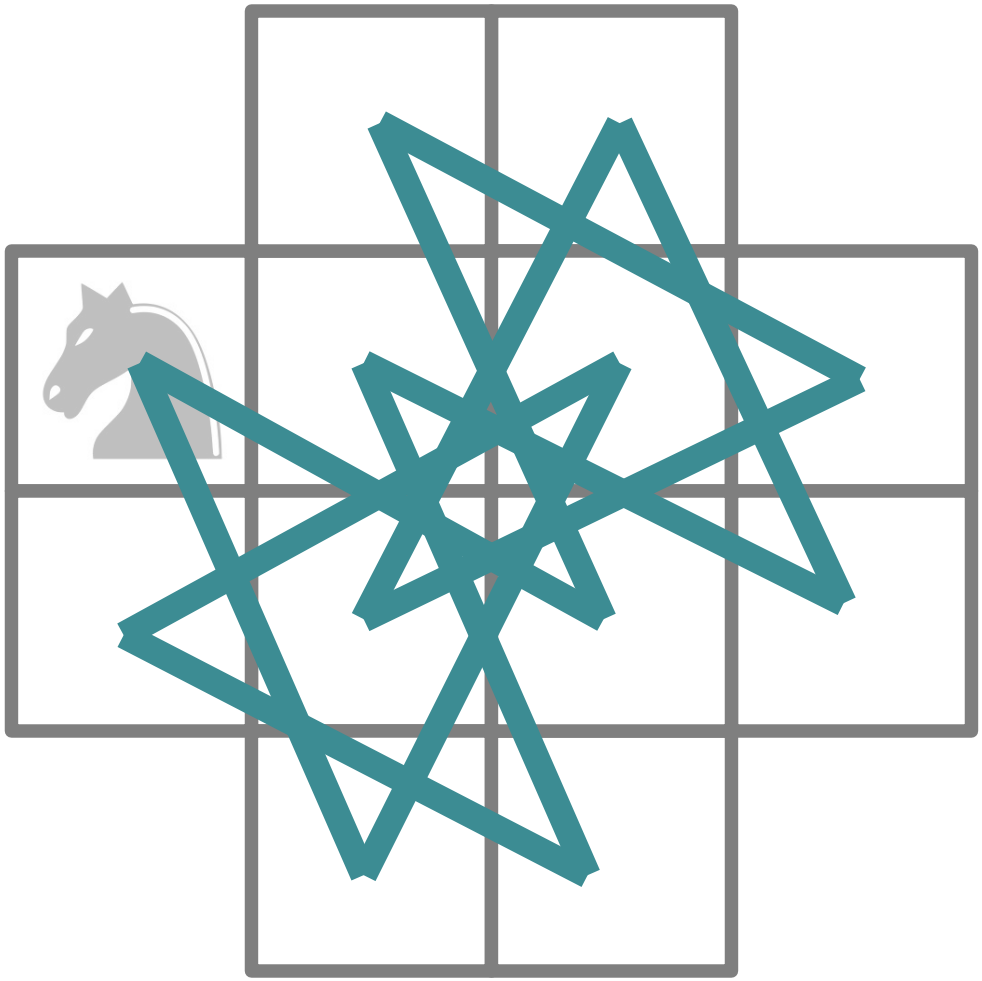


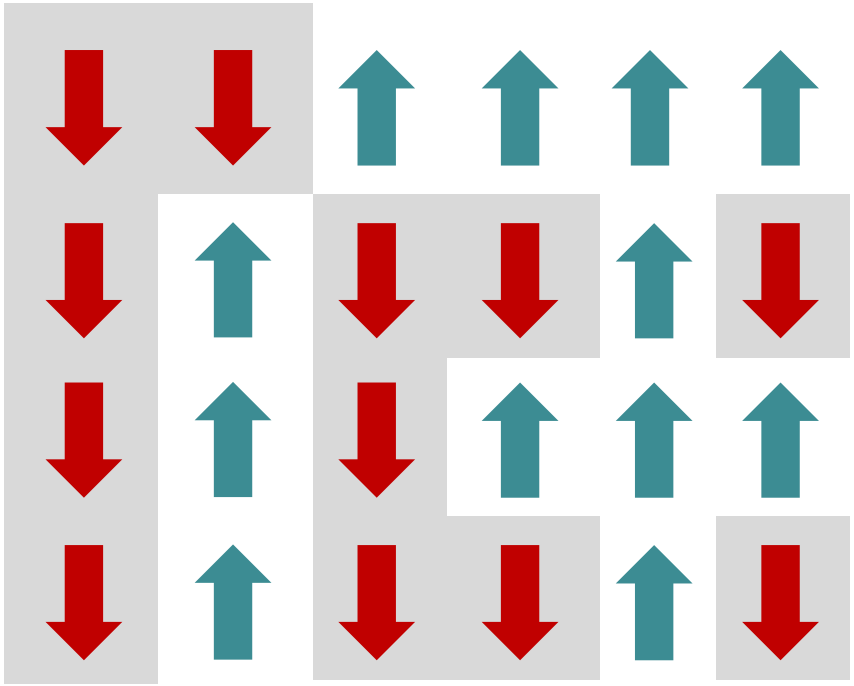




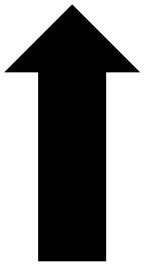








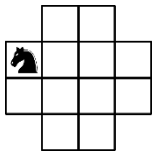
ZLOŽITOSŤ

P  vyriešiť 

ZLOŽITOSŤ

NP

overiť



P

vyriešiť

ZLOŽITOSŤ

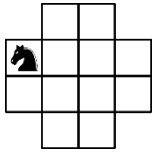
#P

riešení

koľkými spôsobmi sa dá ...

NP

overiť



P

vyriešiť

KLASICKÝ POČÍTAČ

UNIVERZÁLNY TURINGOV STROJ

Alan Turing 1936

0 KLASICKÝ

1 SVET

bit

0 KLASICKÝ

1 SVET

bit 11111100001

0 KVANTOVÝ

1 SVET

01 SUPERPOZÍCIÍ

bit

0 KVANTOVÝ

1 SVET

01 SUPERPOZÍCIÍ

qubit

0 KVANTOVÝ

1 SVET

0 1 SUPERPOZÍCIÍ

qubit

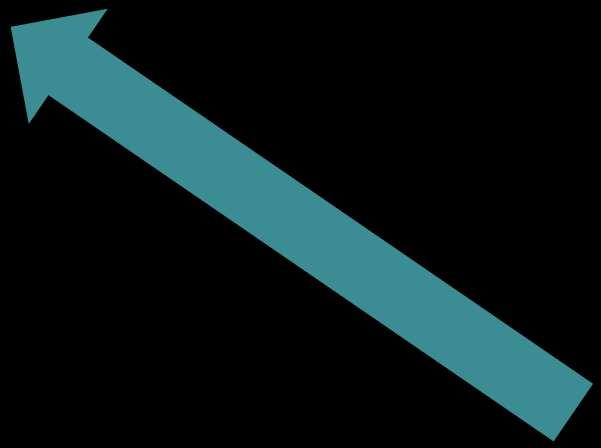
fotón

suprav. obvod

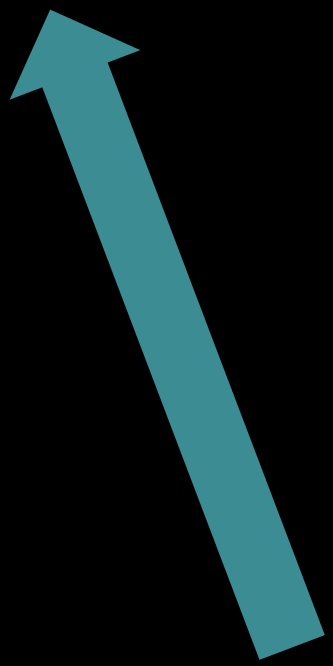
ión v pasci

kvant. bodka

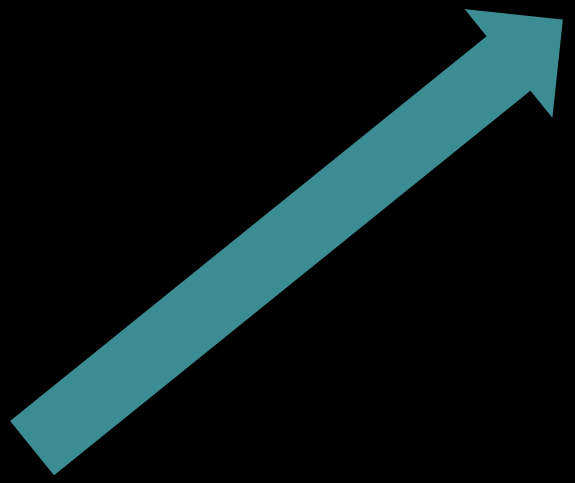
cesta bludiskom



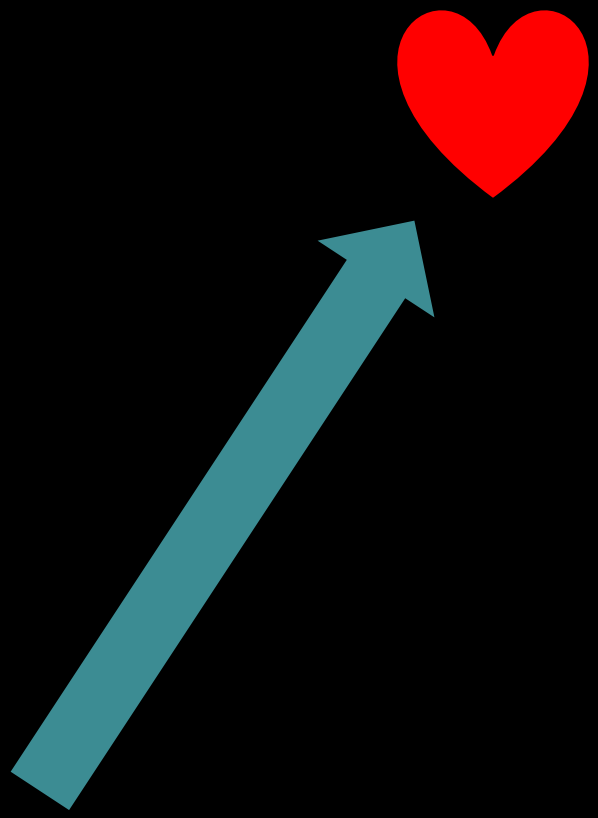
cesta bludiskom



cesta bludiskom

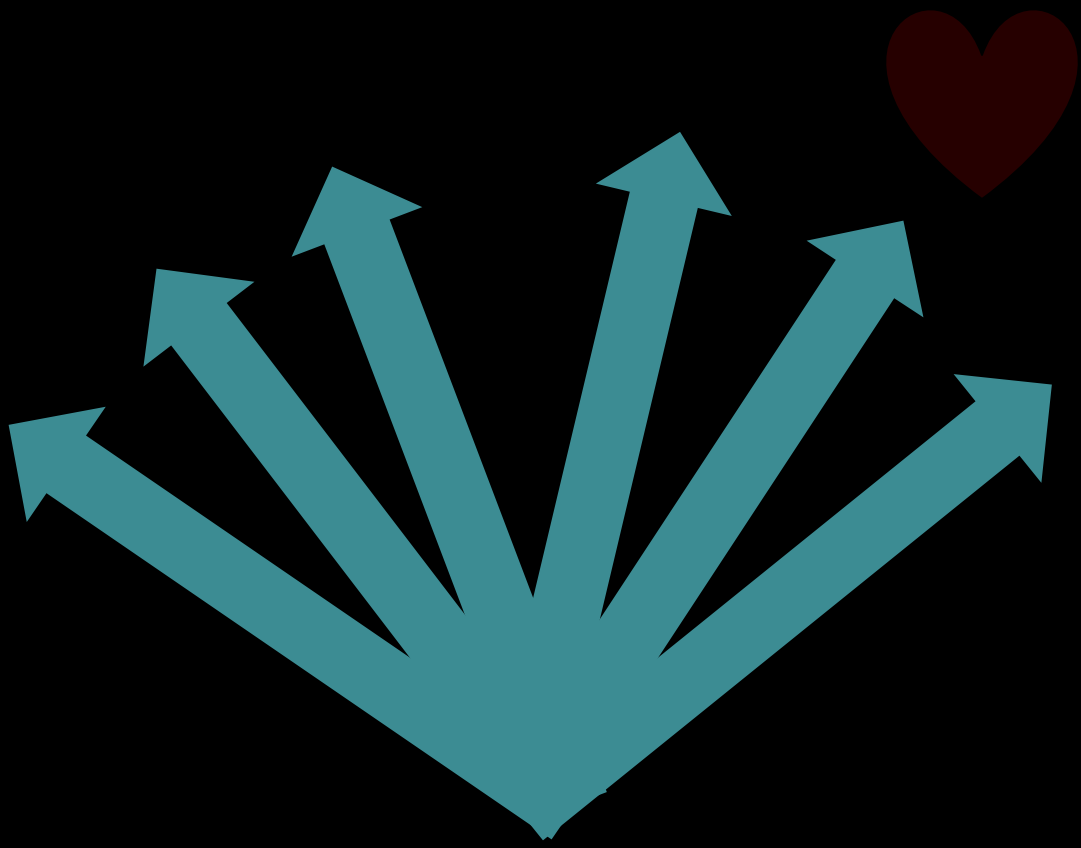


cesta bludiskom

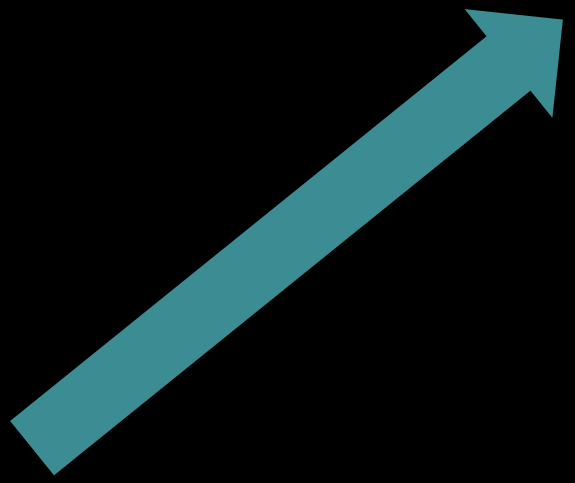


cesta bludiskom

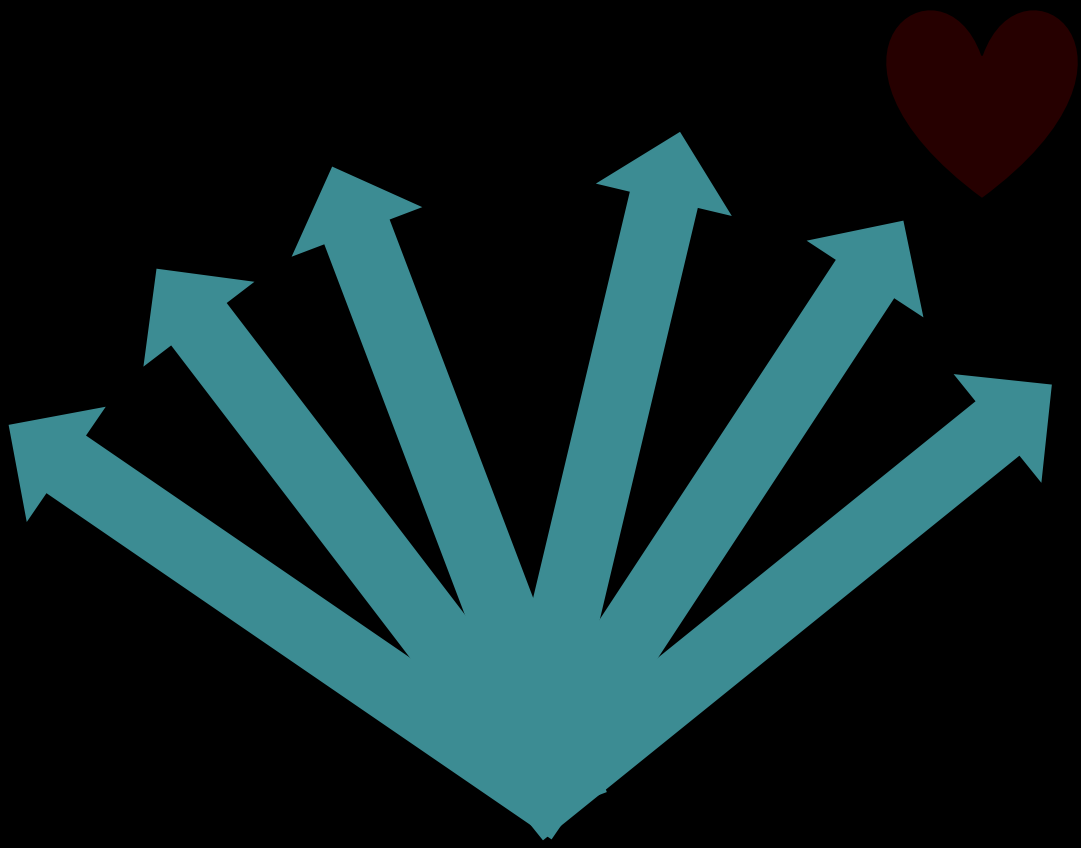
cesta bludiskom



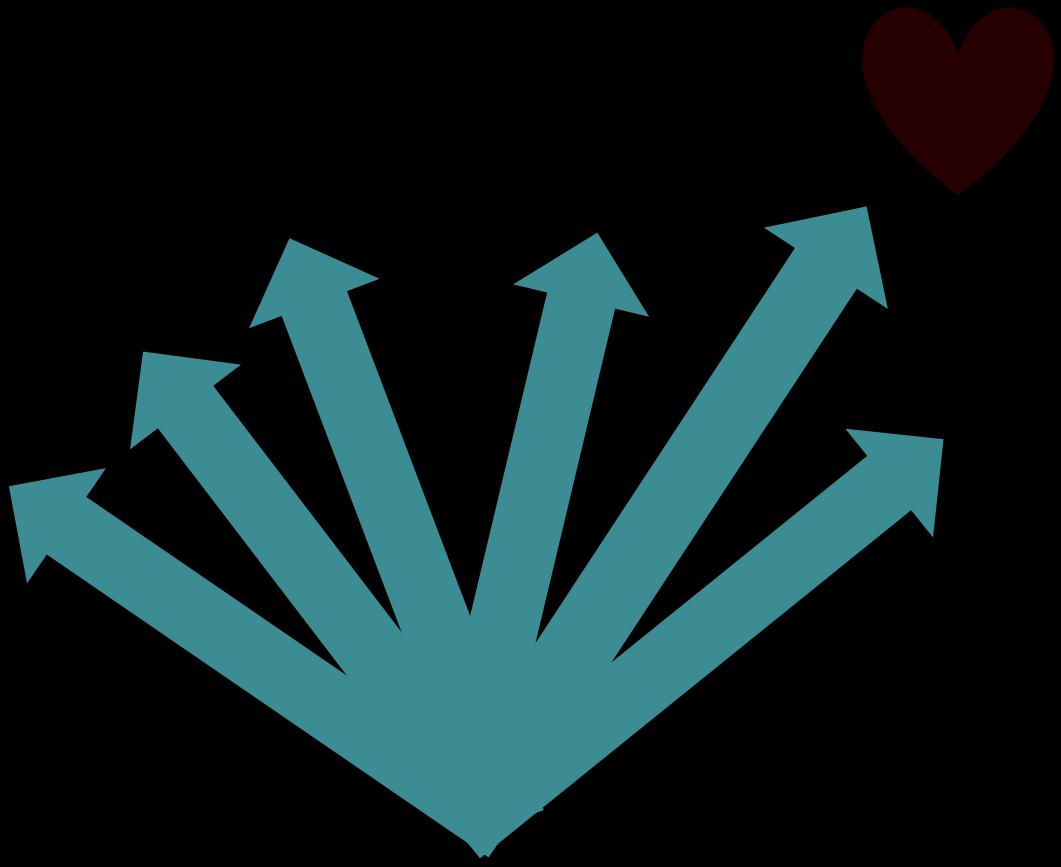
cesta bludiskom



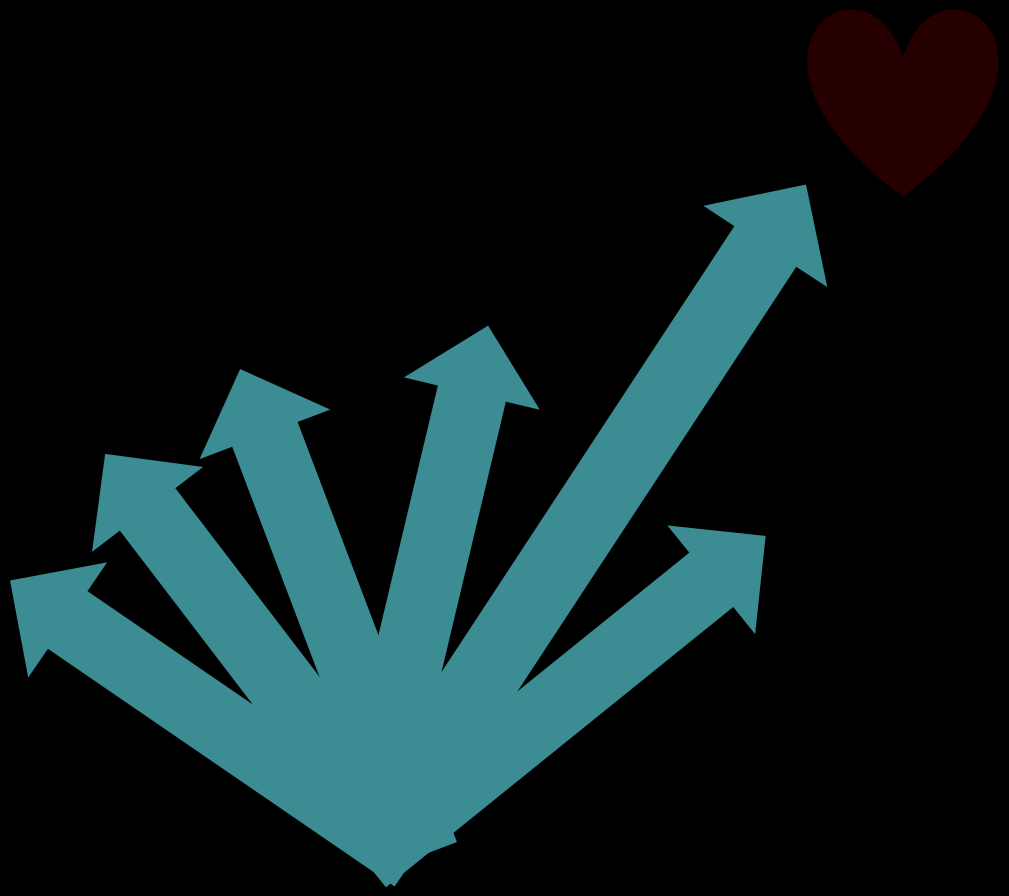
cesta bludiskom



cesta bludiskom

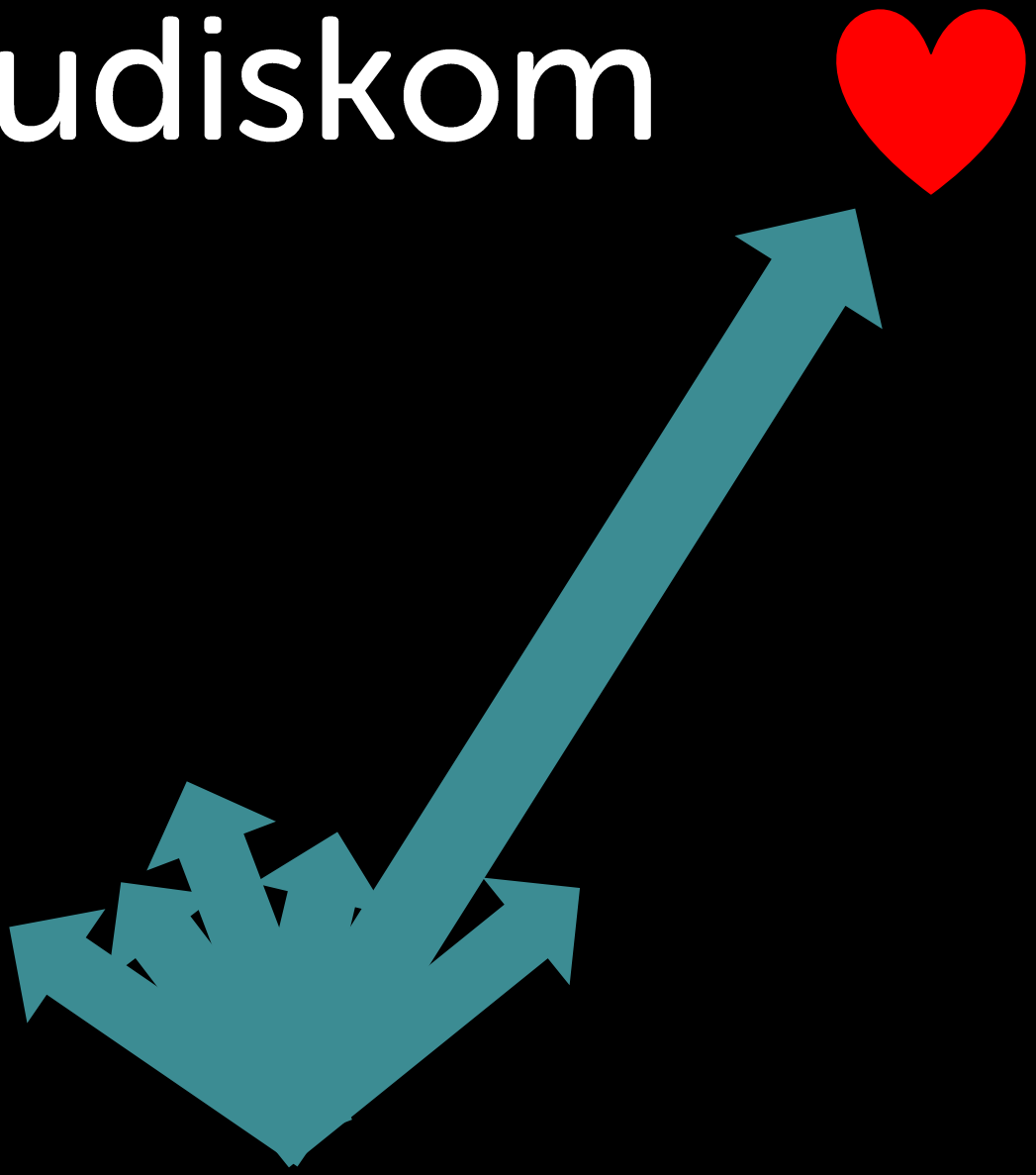


cesta bludiskom



cesta bludiskom

cesta bludiskom



KVANTOVO

má to limity

simulovať

vyriešiť

factoring: $15 = 3 \times 5$

factoring: $15 = 3 \times 5$

$$3931133$$

$$= \bullet \times \bullet \; ?$$

NOC KOSTOLOV 2017 CBBJ

čítame vesmír

DANIEL NAGAJ FÚ SAV

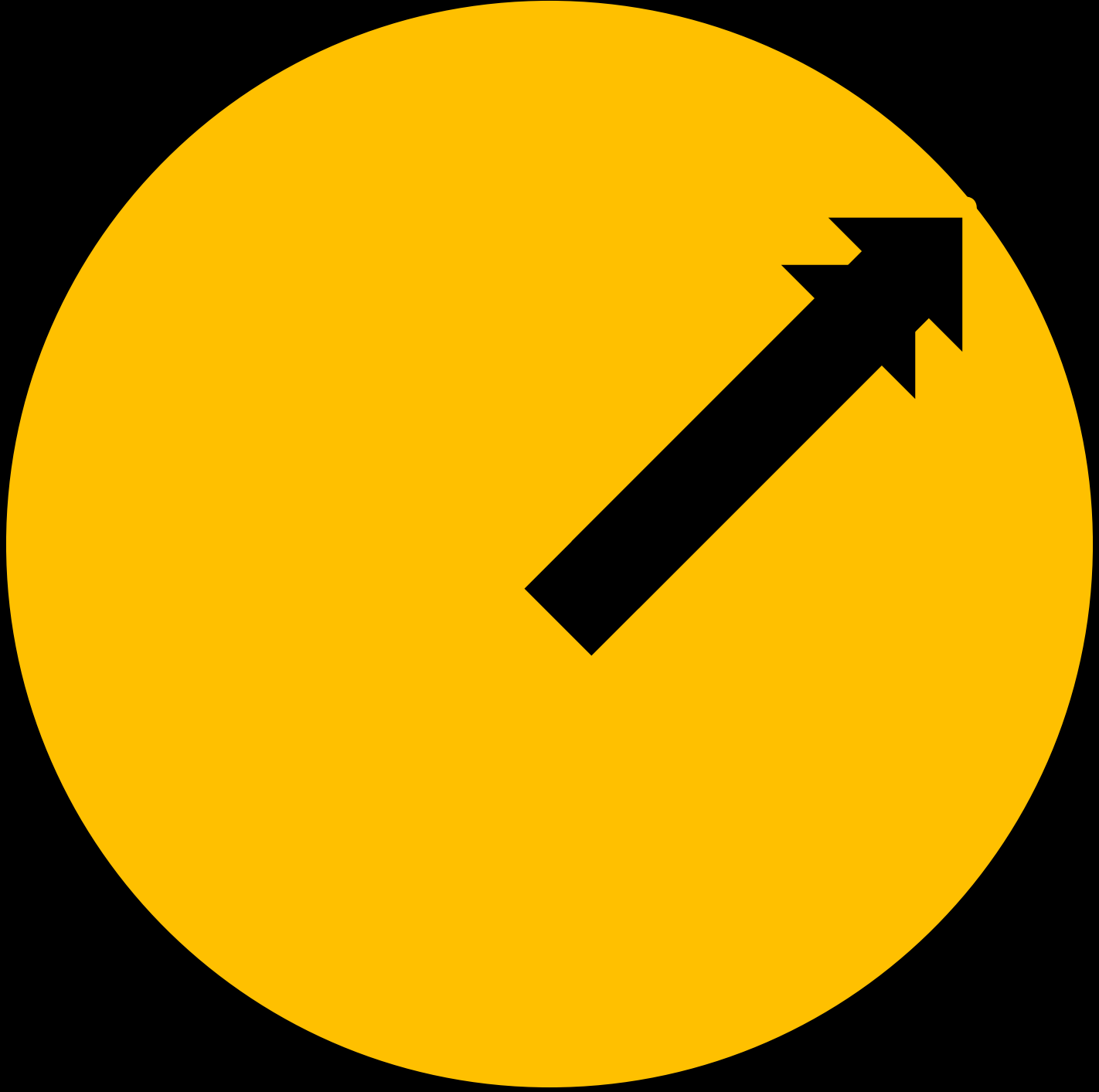
MEGA

- mini

po
čí
ta

na kvantových počítačoch, ktoré ešte ani nemáme

nie



NOC KOSTOLOV 2017 CBBJ

čítame vesmír

DANIEL NAGAJ FÚ SAV