

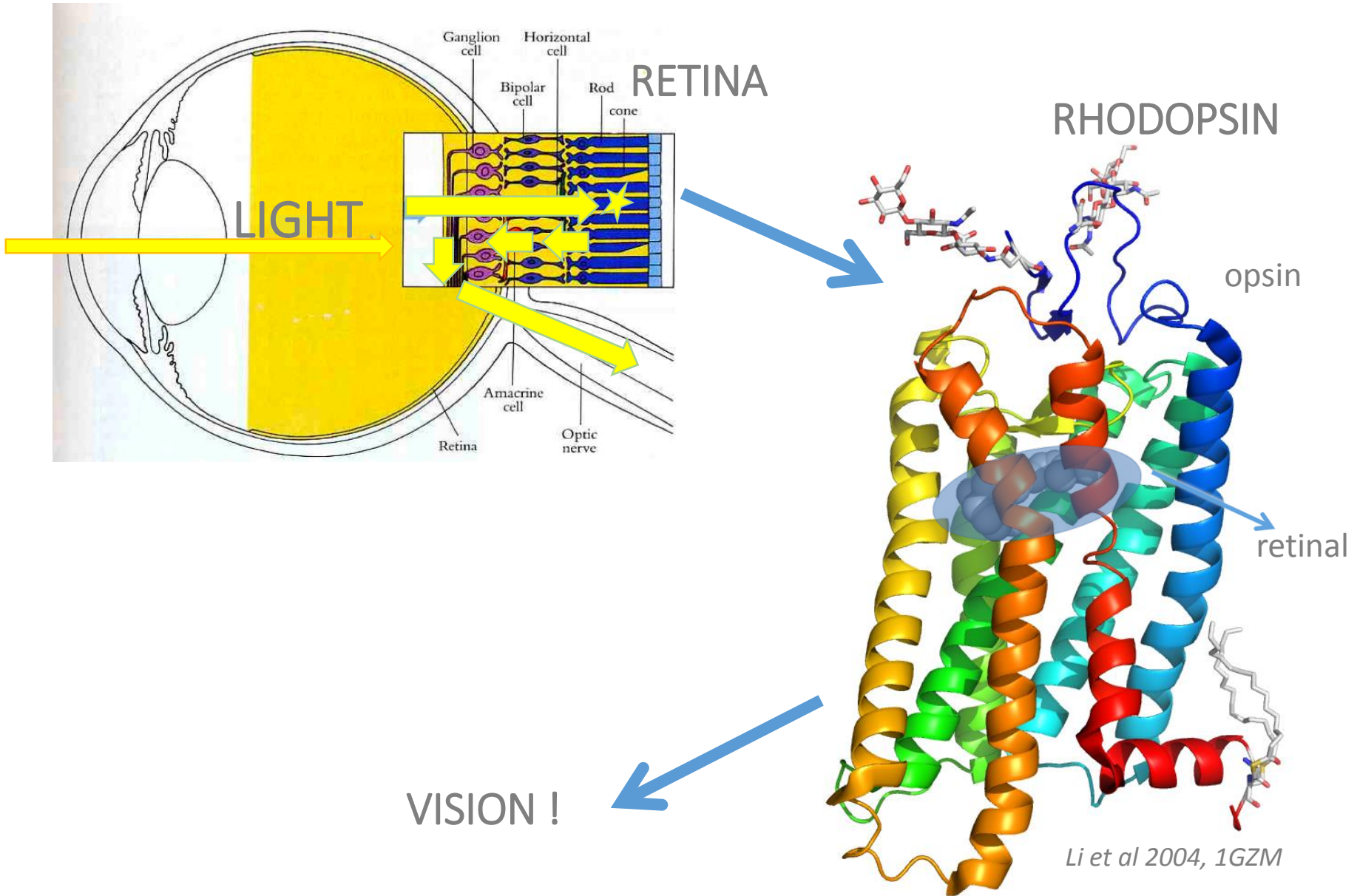


## SwissFEL Exchange Meeting

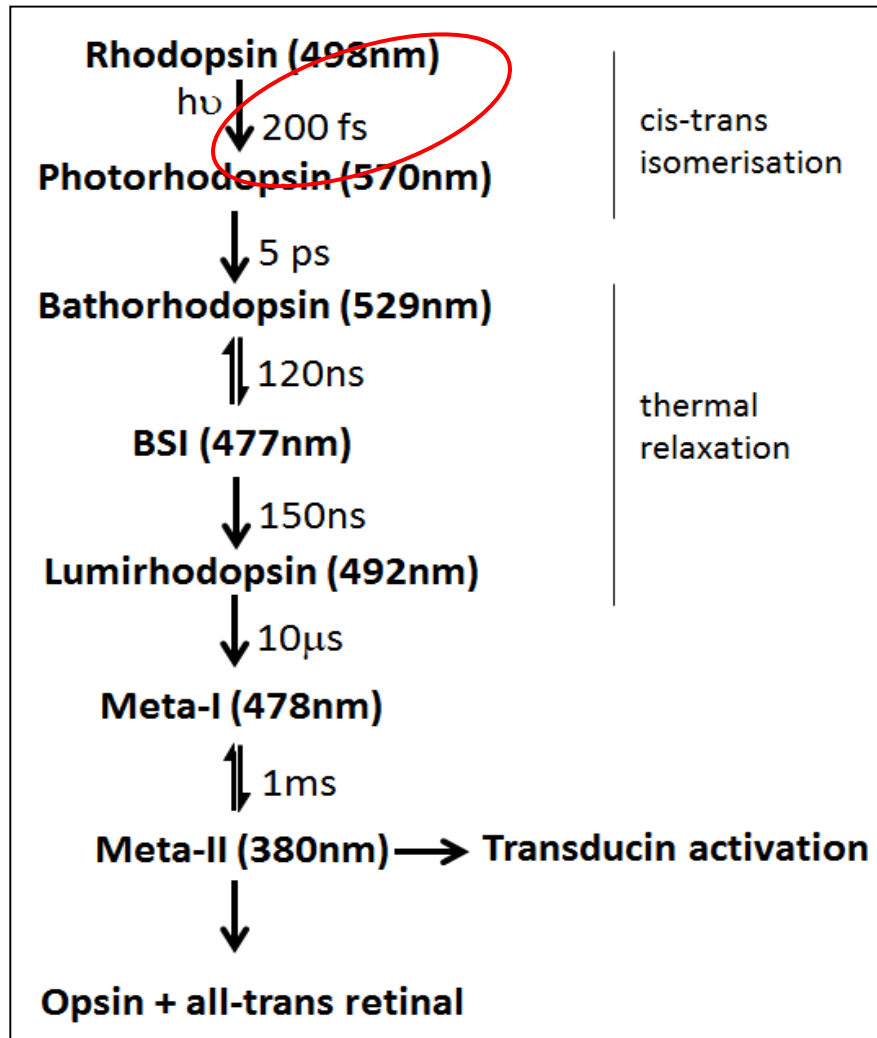
### Rhodopsin ultrafast dynamics at the SwissFEL.

Proposal Panneels-Schertler # 20200597

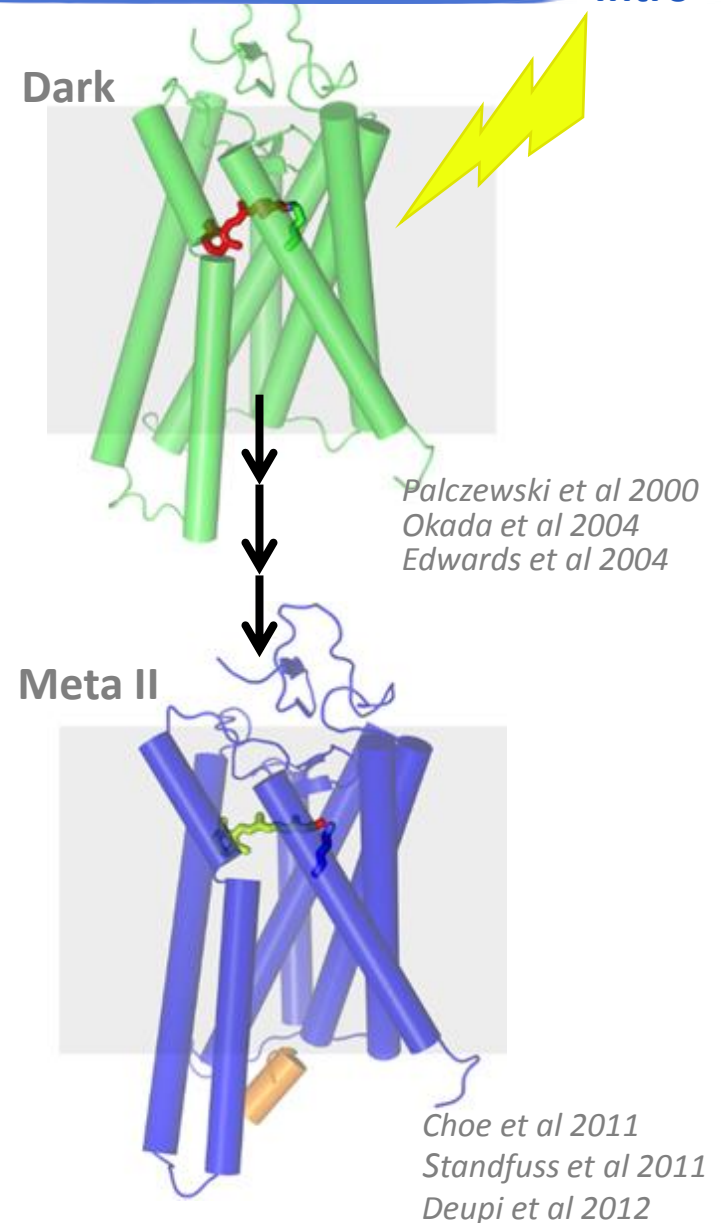
July 21 (Tuesday) 07:00:00 to July 25 (Saturday) 07:00:00 (12 shifts)



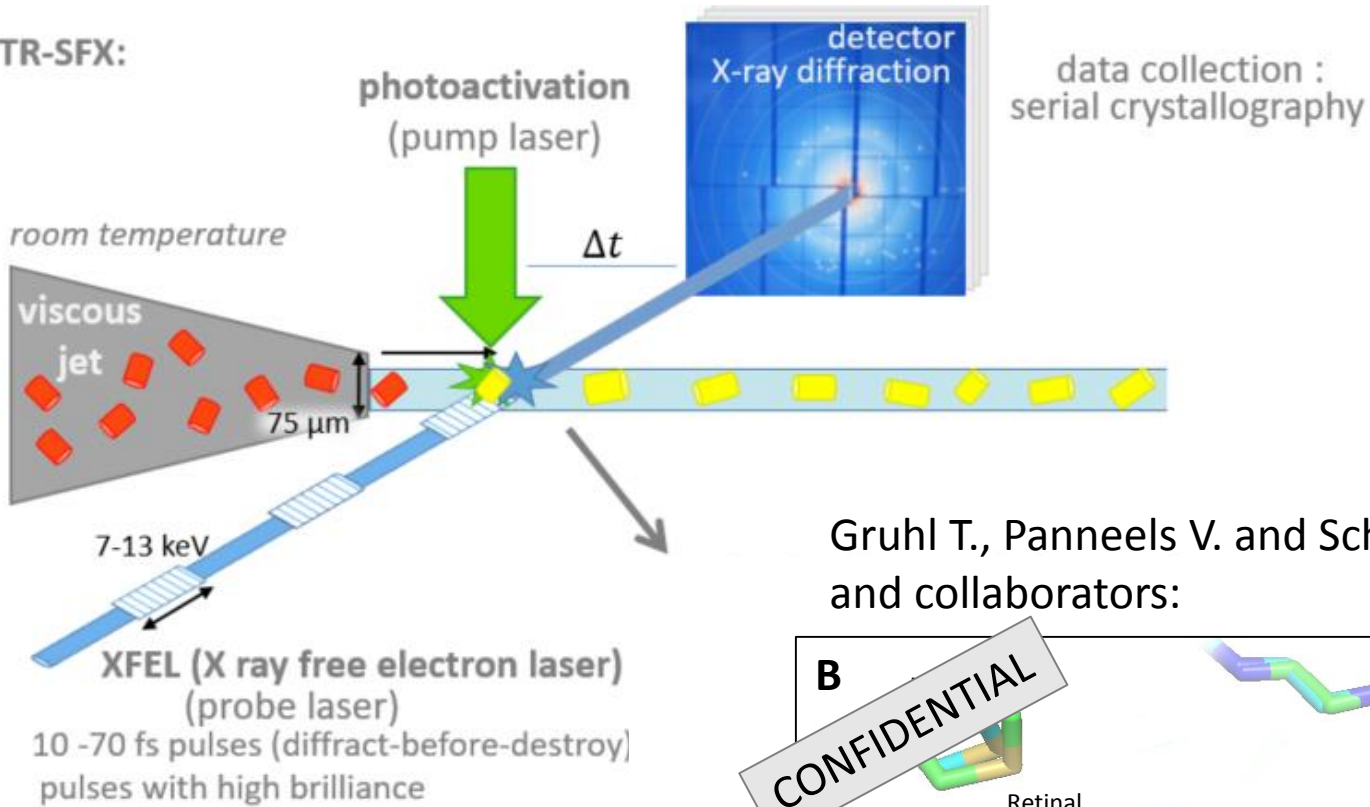
## Retinal chromophore isomerises in less than 200 fs !



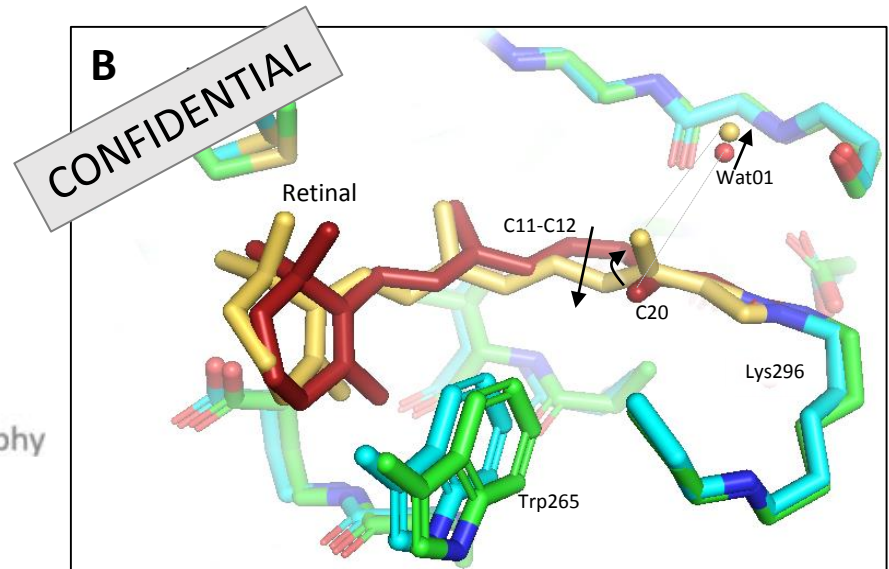
*Mathies et al, Intl Symp. Biophysics  
 on Rhodopsins (Y.Shichida) 2017*



TR-SFX:



Gruhl T., Panneels V. and Schertler G. and collaborators:



■ 1 ps time-delay  
■ dark state

TR-SFX:

time-resolved serial femtosecond crystallography

experiment 20200597

SwissFEL : Alvra station ! Darkness !

- . XFEL, focused **5 x 5  $\mu\text{m}$** , energy **12 keV**, pulse length **xx fs**, max rep. rate **50 Hz**.
- . hutch in red DIM light
- . Detector Jungfrau in 4M mode.

fs-Laser : . **480 nm** pulses.

- . energy pulse **1.5  $\mu\text{J}/\text{pulse}$** , **100fs pulses**, **50 $\mu\text{m}$  FWHM**, x mJ/mm<sup>2</sup> at sample position, 0.5-2 photons / rhodopsin.
- . repetition rate **50 Hz** mode 4 light/1 blocked.
- . Time Delay: static : **600 fs, 300 fs, 150 fs...** - **10 ps** -  
incremental: from picoseconds to minus numbers through the 0 fs.

- Jet :
- . Viscous injector under helium and 200 mbar vacuum.
  - . Reservoir opaque, stainless (60  $\mu\text{l}$ ) - Nozzle **75  $\mu\text{m}$**
  - . Flow 3.3 $\mu\text{l}/\text{min}$ .

Samples : . bovine rhodopsin crystals in LCP. **DIM light**. Plates (10 - 10 x 1.5  $\mu\text{m}$  or less!) of space group P 2<sub>1</sub> 2<sub>1</sub>.

Data : . SwissFEL pipeline: automatic processing and feedback & data storage.

An aerial photograph of a dense forest with a long, transparent tunnel cut through it. The tunnel reveals internal components, including a blue section at the front, a purple section, and a multi-colored section (red, orange, yellow, green, blue) in the middle. In the background, there are some buildings and a circular structure, possibly a water reservoir or a large tank, surrounded by trees.

Thanks for your cooperation !