

# Stimulating new developments in luminescence dating

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# Nordic Centre for Luminescence Research (NCLR)



1. DTU Nutech, Risø Campus
2. The Nordic Laboratory for Luminescence Dating (NLL), Aarhus University

## Research infrastructure:

- OSL dating service
- Instrumentation
- Luminescence R&D
- Training

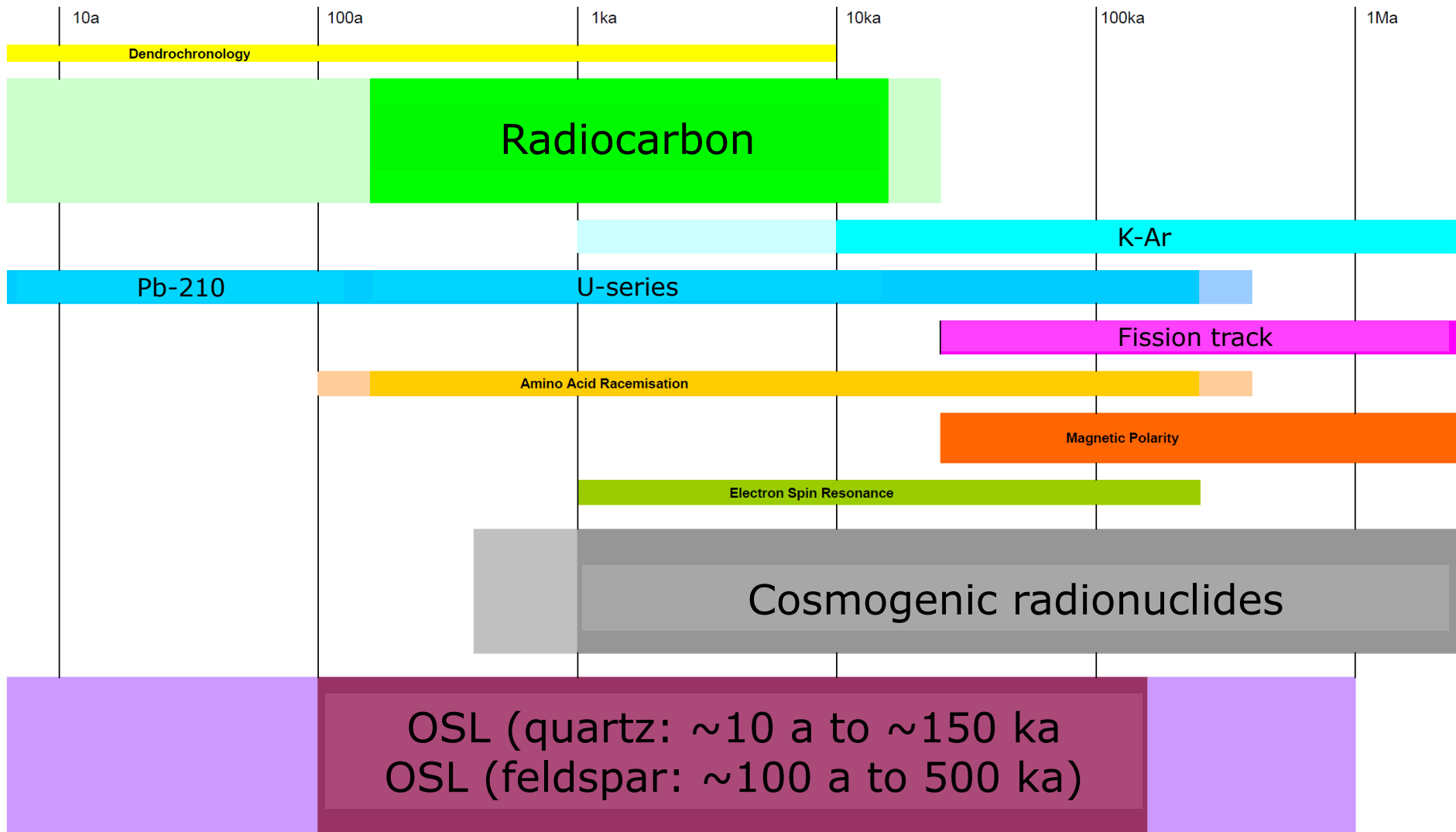
The world's largest luminescence laboratory (22 readers)

>90% of all the luminescence research and ages generated world-wide are based on instrumentation and measurement protocols developed by DTU Nutech and NLL

Our publications cited more than 11,000 times (past 15 years).

~700 luminescence ages/year

# Why is luminescence dating important?



# Background

**Aitken**: Luminescence dating (in the West) began in Oxford in the 1960's

Risø: need for better, less labour intensive automatic instrumentation (1970's)

First automatic TL reader for luminescence dating to the Oxford Research Laboratory for Archaeology and the History of Art in **1983**

**Huntley et al. (1985)**: quartz dating using OSL possible (but technologically demanding and expensive)

**Hütt et al. (1988)**: feldspar dating using infrared light emitting diodes (IR LEDs). Much simpler and cheaper.

**1991**: Risø IR LED stimulation attachment

**1992**: Risø Green filtered halogen light source attachment

# The Risø TL/OSL reader – a research instrument

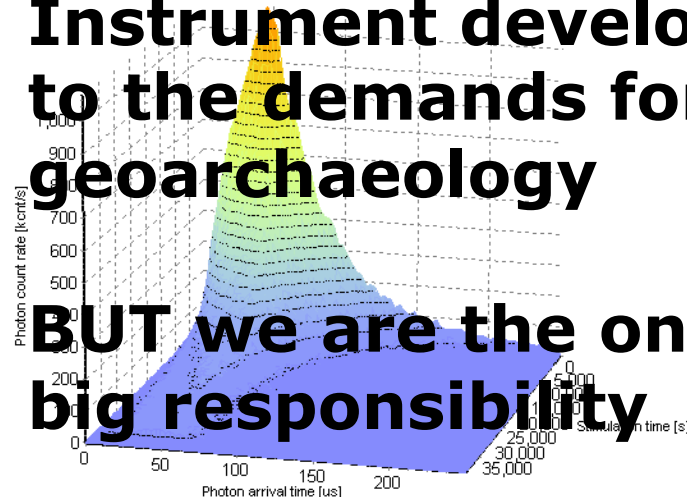
- Blue light stimulation

- ✓ **Instrument development** follow both from demands for better chronologies and from fundamental research into the physics of luminescence
- Imaging techniques based on an
- Sample camera
- Pulsed stimulation (POSL) and correction

- Radioluminescence

- ✓ **Instrument development** has responded well to the demands for improved chronologies in geoarchaeology
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- ✗ **BUT we are the only major supplier. This is a big responsibility**
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Datafile: test\_010201.TRC

25 mW  
violet - Blue  
Laser Diode  
(405 nm)

# Infrastructure – Dating capacity

Luminescence now a major dating technique

Could it be made more widely available?

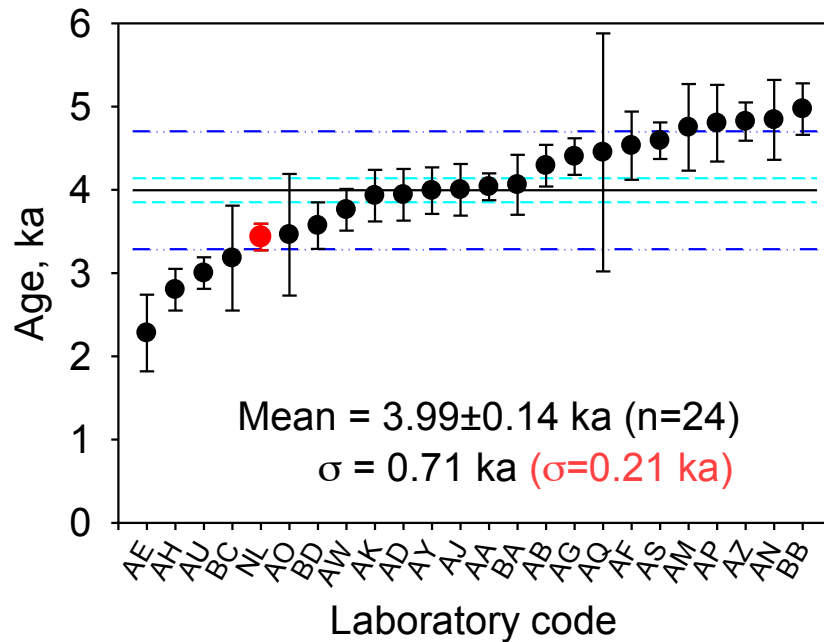
Only a few labs willing to date samples not directly connected to their own research

⇒ **Restricted service infrastructure limits other people's research**





# Inter-laboratory comparison



A single international inter-comparison with an “easy” sample. 24 respondents

⇒ 18% standard deviation!

**A real need for on-going programmes of inter-calibration and inter-comparison.**

# Summary

- 1) Instrument development has responded well to demands for improved chronologies – likely to continue
- 2) Need for broader base to our research into instrument development?
- 3) Need for greater capacity for 'routine' luminescence ages
- 4) Need for on-going programmes of inter-calibration and inter-comparison