Stimulating new developments in luminescence dating



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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

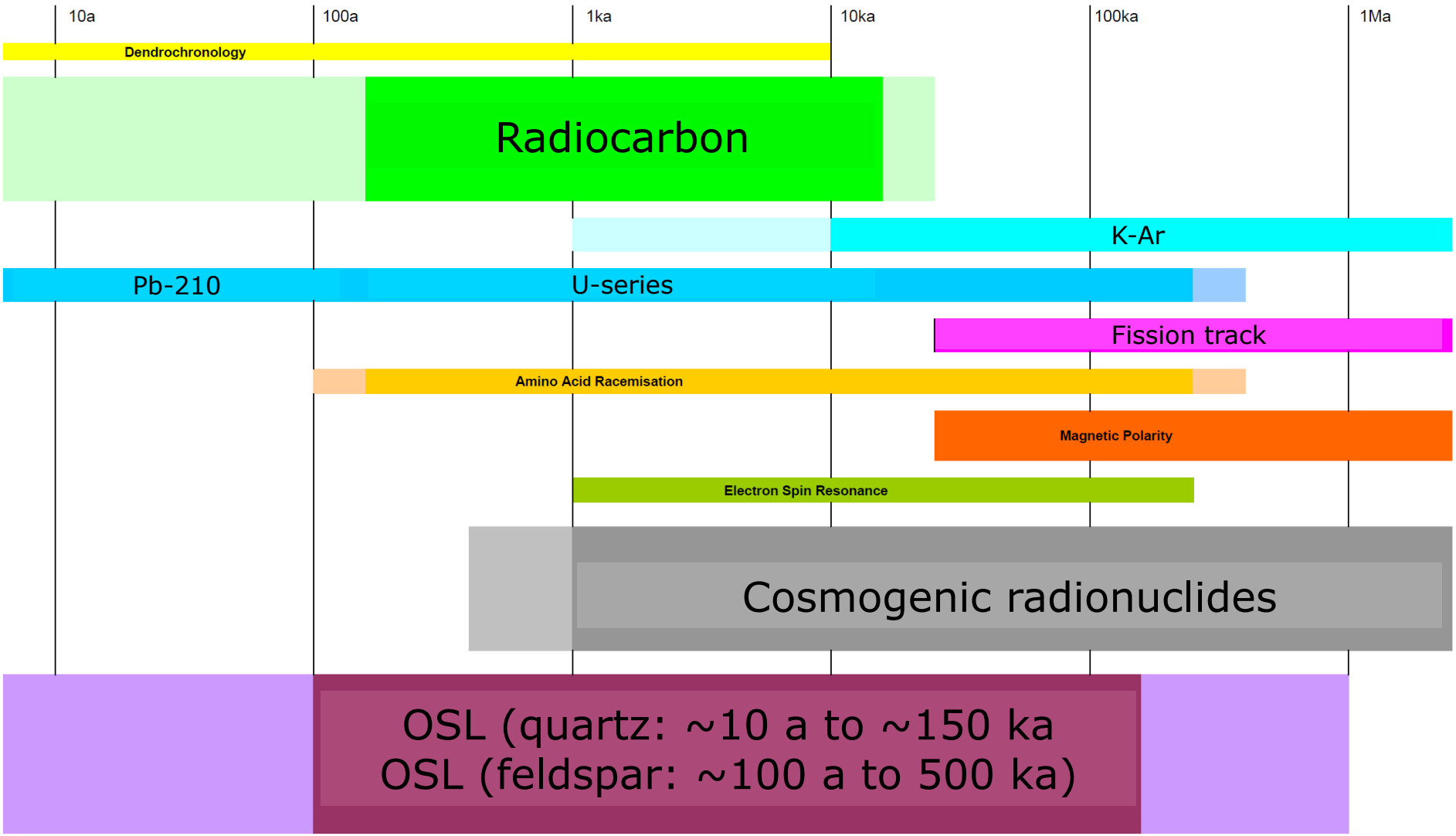
The world's largest luminescence laboratory (22 readers)

>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?



After Aitken (1998)

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

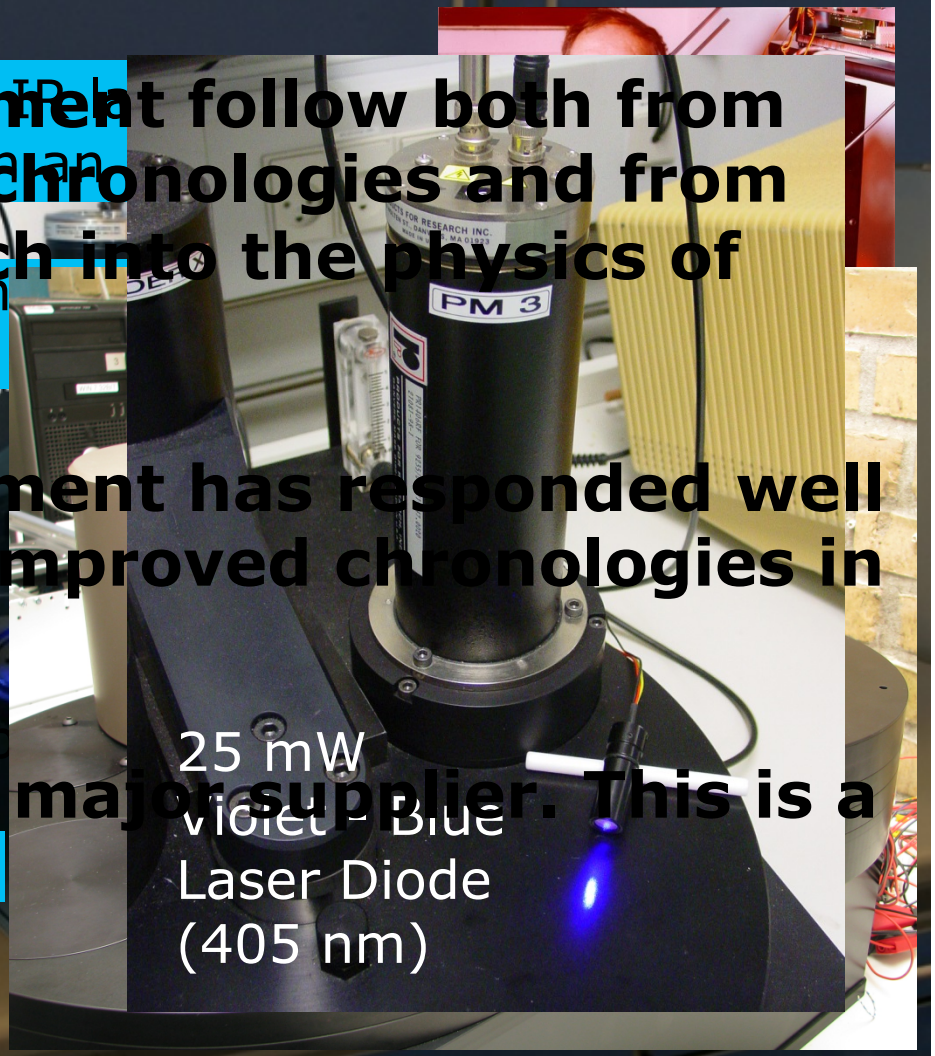
- Blue light stimulation
- ✓ Single-grain OSL (travel and IR)
- Imaging techniques based on an
- Sample camera
- Pulsed stimulation (POSL) an collection
- Radioluminescence
- ✓
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Instrument development follow both from demands for better chronologies and from fundamental research into the physics of luminescence

Instrument development has responded well to the demands for improved chronologies in geoarchaeology

BUT we are the only major supplier. This is a big responsibility





Infrastructure – Dating capacity

Luminescence now a major dating technique

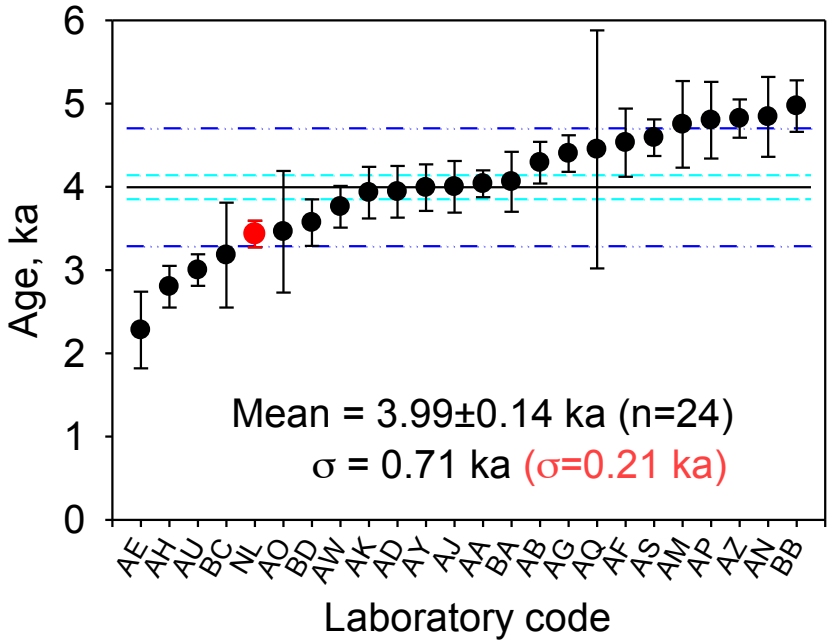
Could it be made more widely available?

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