

# Metrology for the harmonisation of measurements of environmental pollutants in Europe

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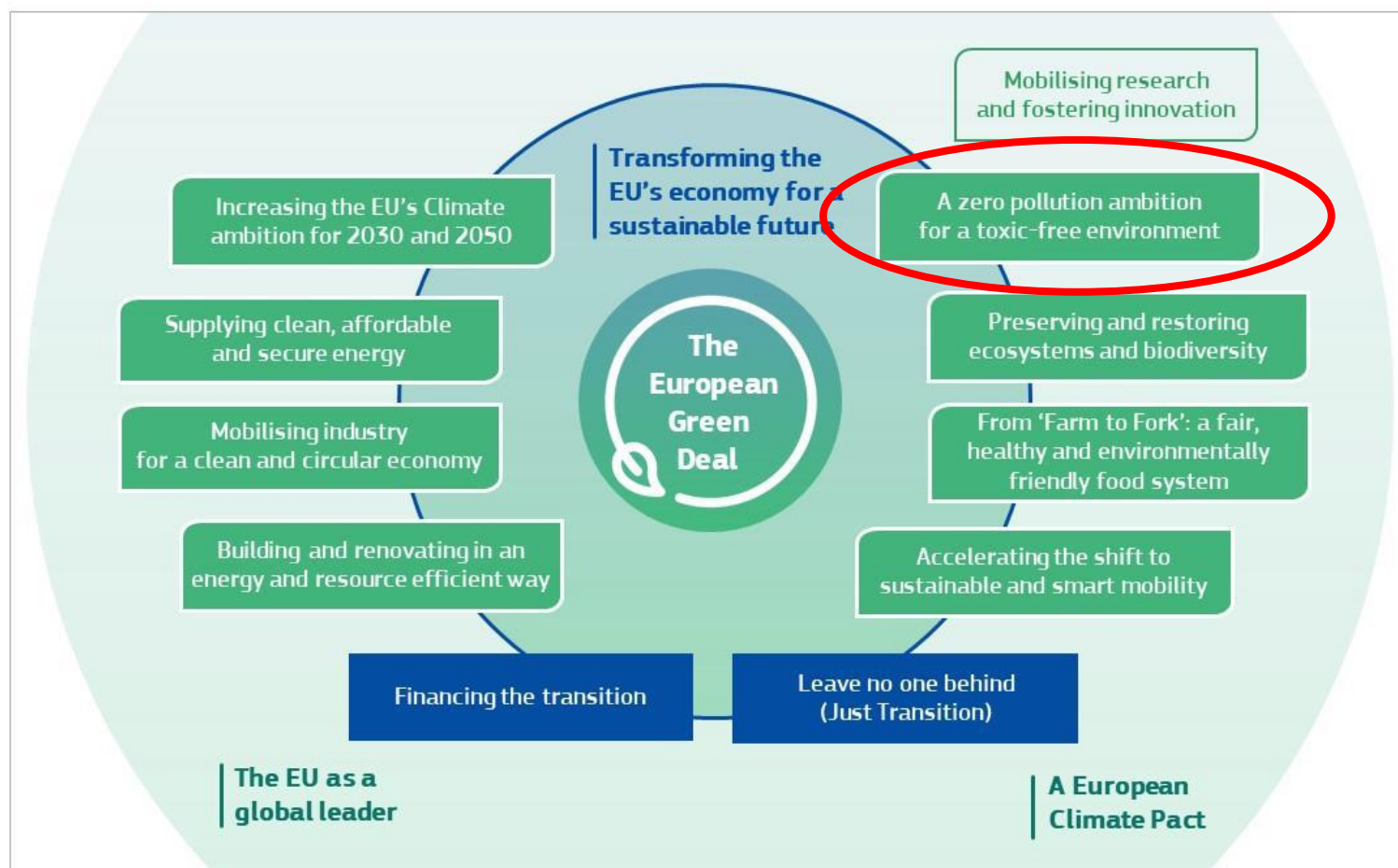
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## Introduction of MetroPOEM

### ➤ Key facts:

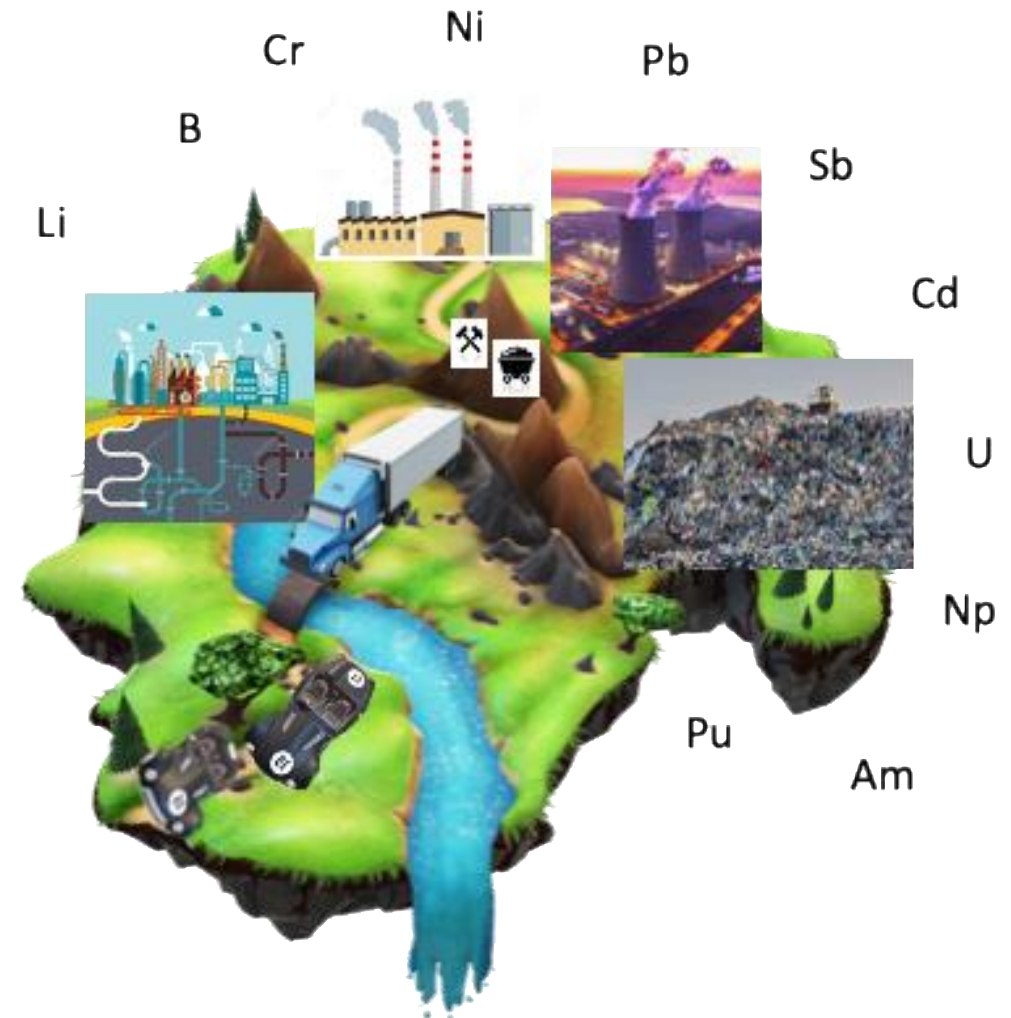
- ✓ Start date: 01 October 2022
- ✓ Duration: 36 months
- ✓ 22 partners from 13 countries will contribute with in total **320 months of work!**  
Austria, Czech Republic, Denmark, Finland, France, Germany, Norway, Romania, Serbia, Slovenia, Switzerland, Türkiye and United Kingdom
- ✓ Project Website: <https://www.npl.co.uk/euramet/metropoem>
- ✓ This project was selected for funding from the Green Deal Call 2021 of the European Partnership on Metrology research funding program: <https://www.metpart.eu/>

## The European Green Deal, Document: "COM/2019/640 final"



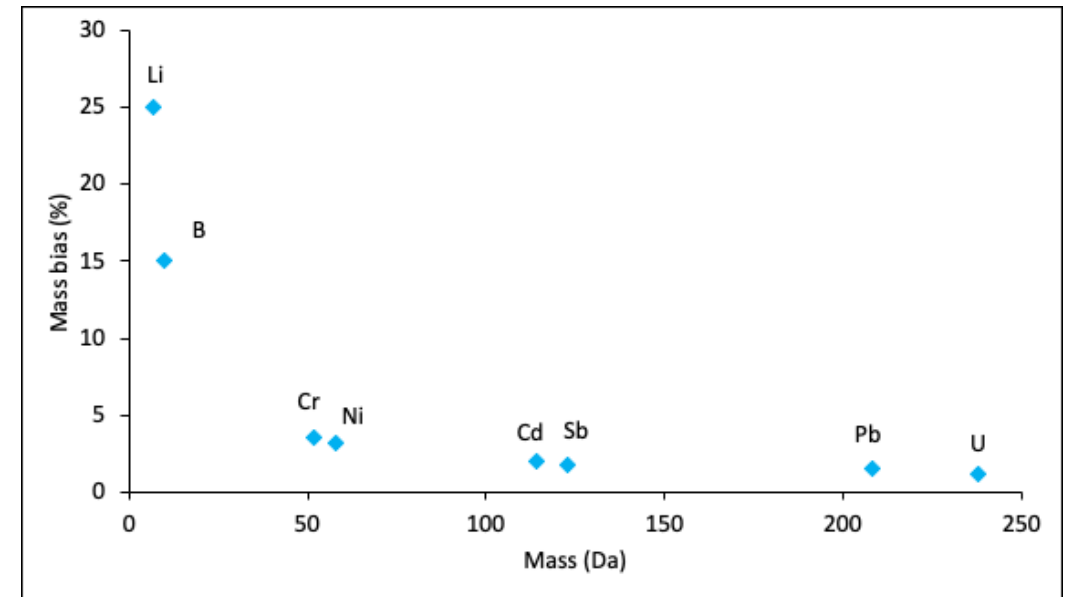
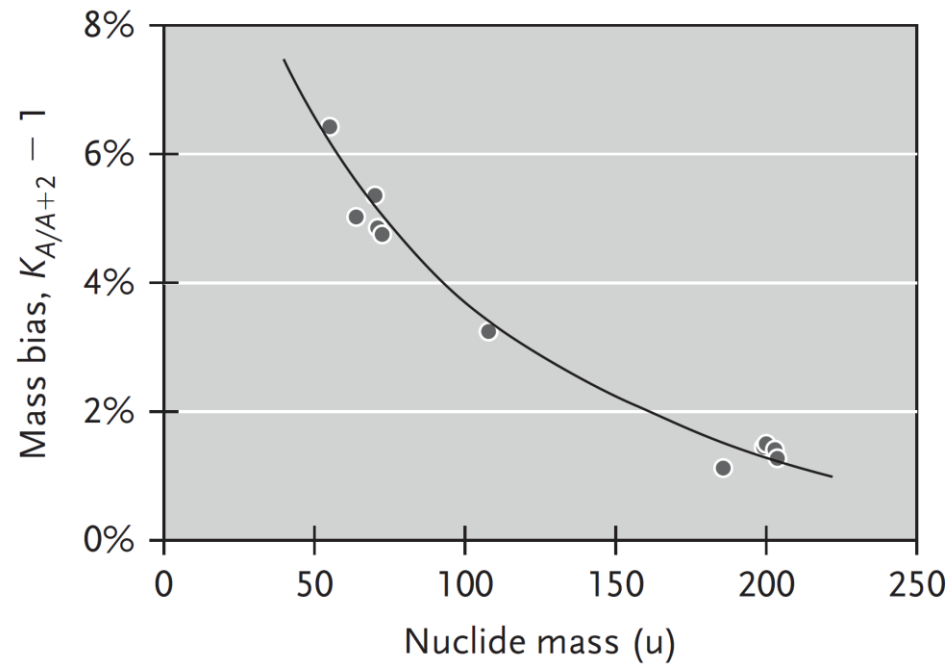
## Introduction of MetroPOEM

- **Key Aspects:**
- **The zero-pollution ambition promoted by the European Green Deal**, requires highly sensitive and state-of-the-art detection techniques for the measurement of ultra-low amounts of pollutants.
- **Mass spectrometry** is a key method,
  - ✓ with high potential for reducing measurement uncertainties and detection limits,
  - ✓ but there is no existing traceability chain for **radioactive elements**,
  - ✓ and there is a lack of SI-traceable isotope reference materials for **stable isotopes**.



## The lack of SI-traceable isotope reference materials for stable isotopes

The **mass bias effect** (instrumental mass fractionation) breaks the traceability chain, especially for measurements with ICP-MS systems



## Mass spectrometry systems included in the project

- **ICP-QMS** Inductively Coupled Plasma Quadrupole Mass Spectrometer
- **ICP-MS/MS** Inductively Coupled Plasma Tandem Mass Spectrometer
- **ICP-SFMS** Inductively Coupled Plasma Sector Field Mass Spectrometer
- **MC-ICP-MS** Multi-Collector Inductively Coupled Plasma Mass Spectrometer
- **SIMS** Secondary-Ion Mass Spectrometer
- **TIMS** Thermal Ionisation Mass Spectrometer
- **AMS** Accelerator Mass Spectrometer
- **ICP-TOF-MS** Inductively Coupled Plasma Time of Flight Mass Spectrometer
- **SNMS** Secondary Neutral Mass Spectrometer
- **HR-ICP-SF-MS** High Resolution Inductively Coupled Plasma Sector Field Mass Spectrometer
- **ICP-QQQ-MS** Triple quadrupole Inductively Coupled Plasma Mass Spectrometer

## Work packages

**WP6:** Management and coordination

### Radioactive Pollutants

**WP1:** Establish and compare the selectivity and detection limits of different mass spectrometers

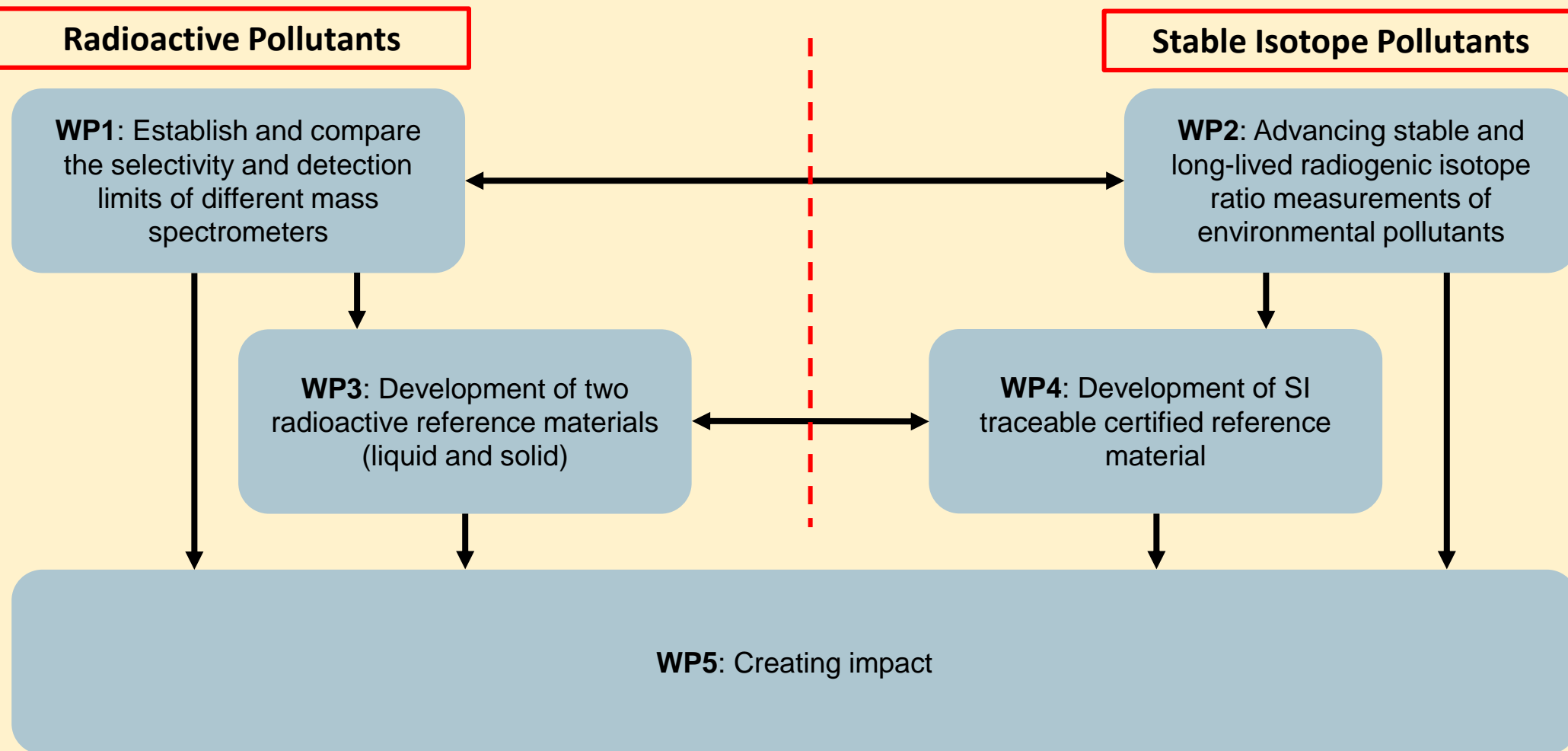
**WP3:** Development of two radioactive reference materials (liquid and solid)

### Stable Isotope Pollutants

**WP2:** Advancing stable and long-lived radiogenic isotope ratio measurements of environmental pollutants

**WP4:** Development of SI traceable certified reference material

**WP5:** Creating impact



## WP5: Creating Impact

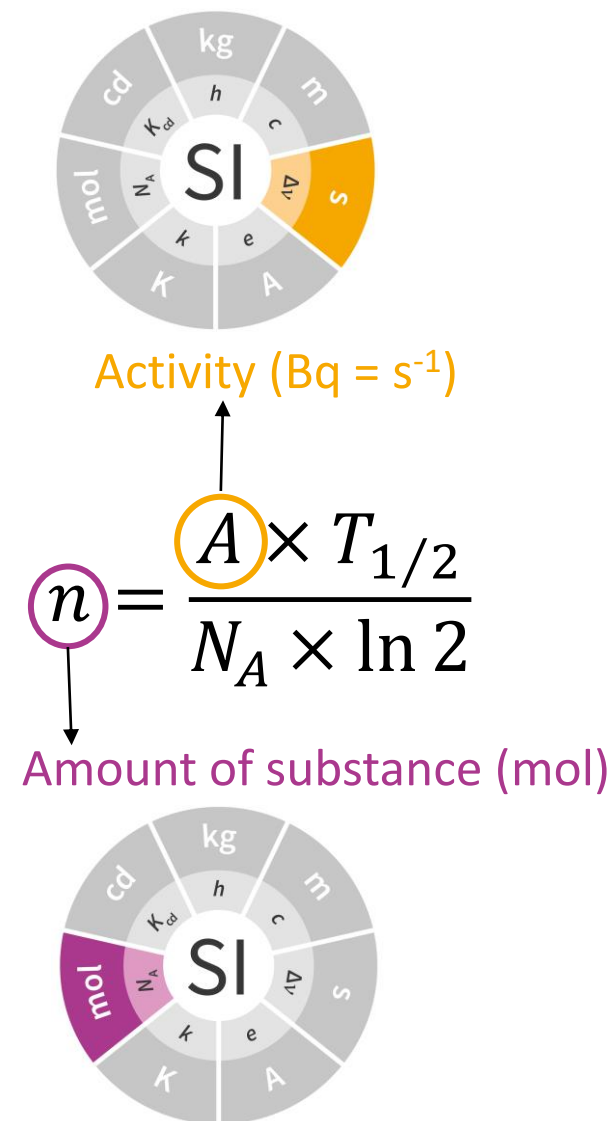
### Progress

- Stakeholder committee in progress
- Website in place: <https://www.npl.co.uk/euramet/metropoem>
- Presence in LinkedIn and ResearchGate
  - ✓ <https://www.linkedin.com/in/metropoem-project-308762251/>
  - ✓ <https://www.researchgate.net/project/MetroPOEM-Metrology-for-the-harmonisation-of-measurements-of-environmental-pollutants-in-Europe>
- First press release issued
  - ✓ <https://www.stuk.fi/web/en/about-us/cooperation/metropoem-project>



## Impact of MetroPOEM

- **Establish link** between radiometric techniques and mass spectrometry, bridging the gap between the activity (Bq) and the amount of substance (mol) of an isotope
- Traceable aqueous radionuclide standards (U, Np, Pu, Am, Sr, Ra) suitable for mass spectrometry systems
- Close the **traceability gap** for isotope ratio measurement resulting from isotopic fractionation (mass bias)
- Guide on the use of mass spectrometry for **low level radionuclide detection**
- Report of different instrument's **advantages and limitations**
- Three SI-traceable **reference materials**
- Establish SI-traceable **calibration chain** for single collector ICP-MS
- **Harmonized methods** for measurement of polluting elements using mass spectrometric techniques





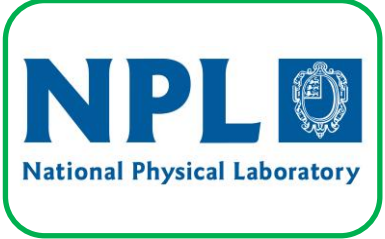
WP6



WP3



WP2



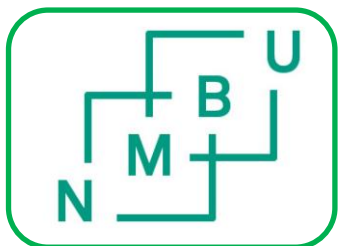
WP1



WP4



# Consortium



WP5



## Funding Acknowledgement

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