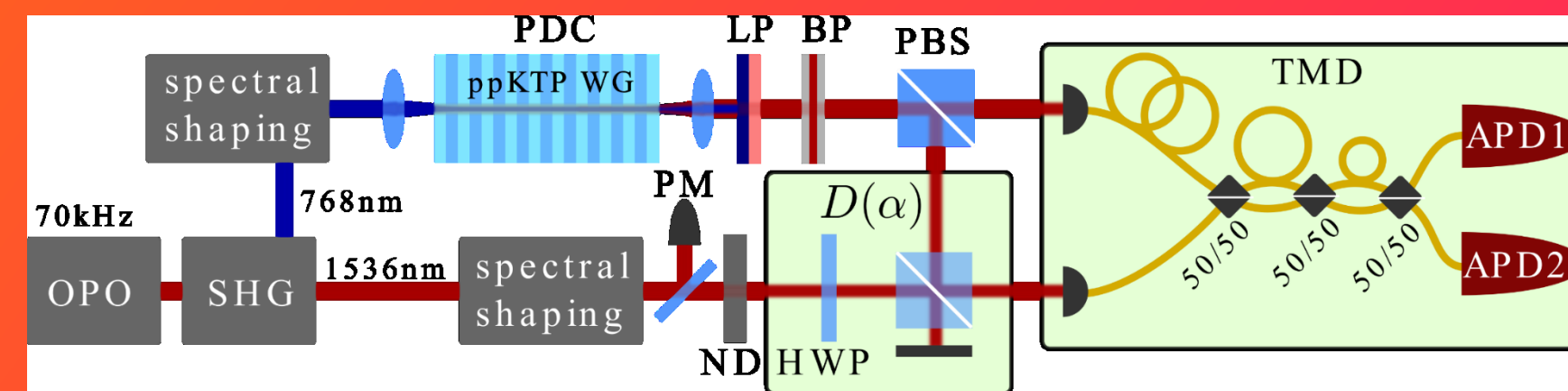
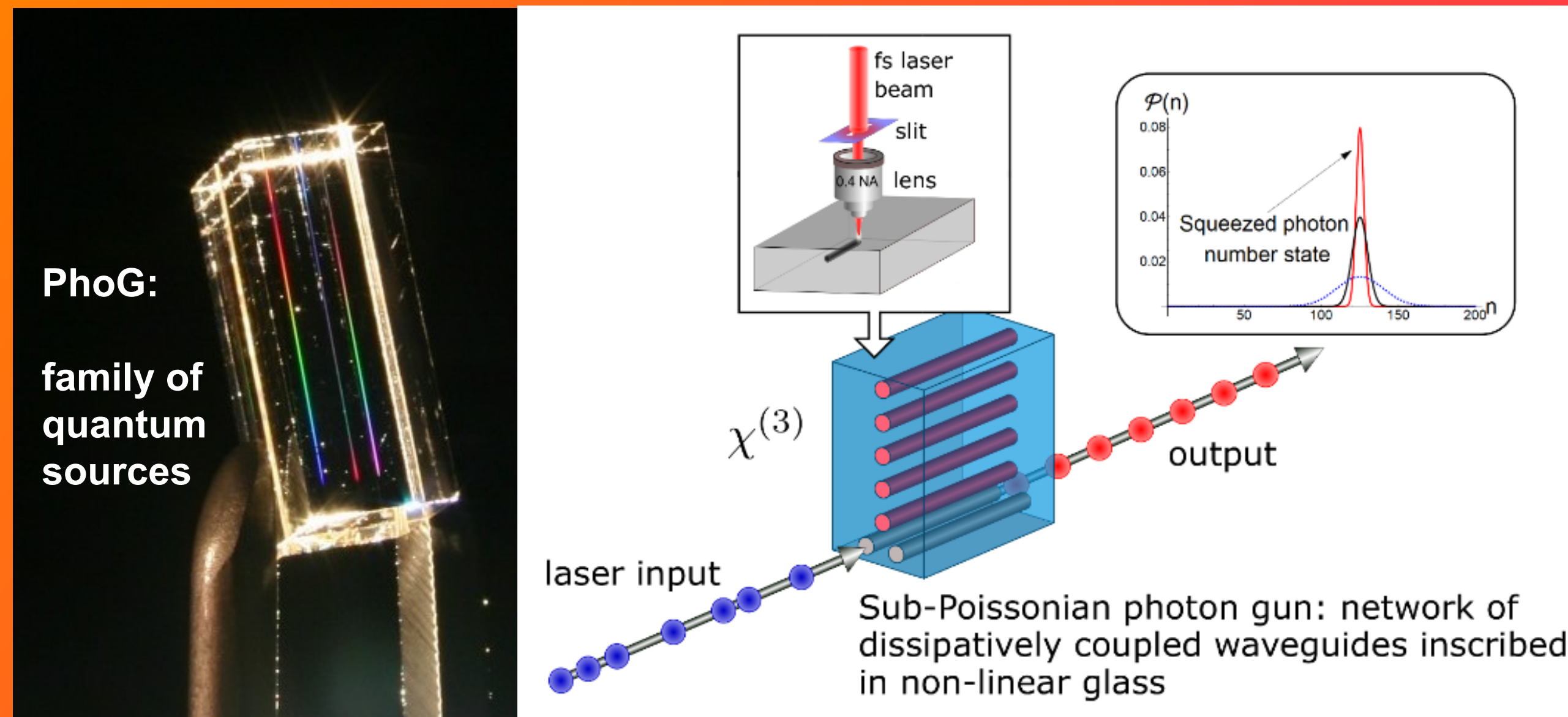


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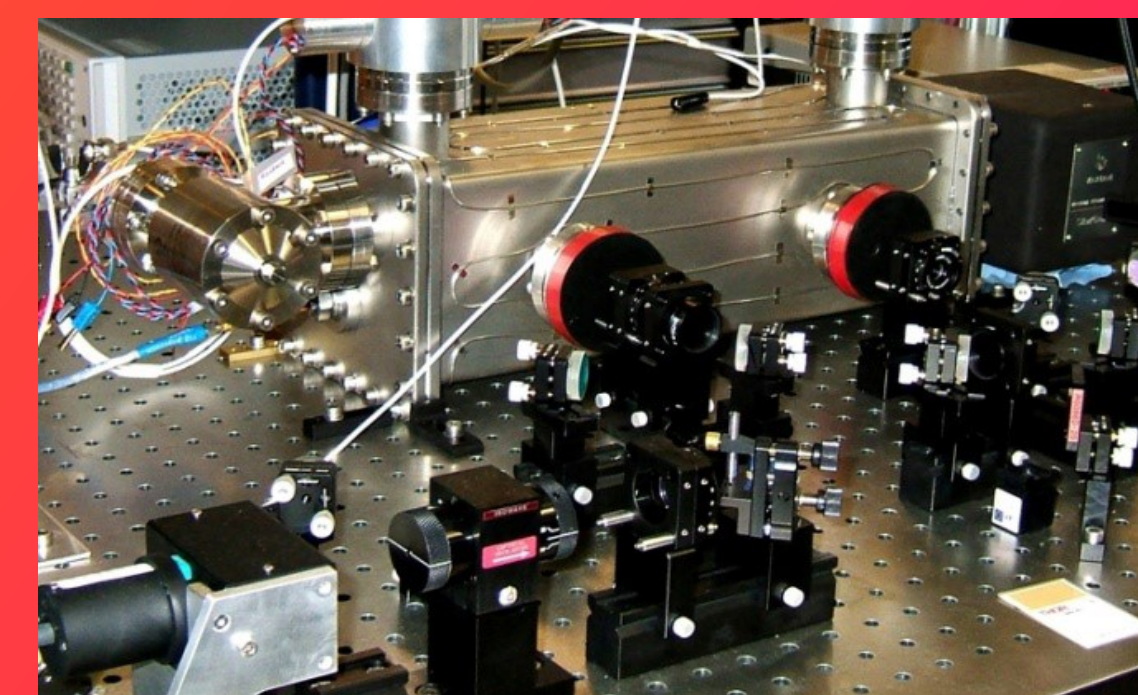
Sub-Poissonian Photon Gun by
Coherent Diffusive Photonics

- The goal of the project is to deliver deterministic and compact sources of highly non-classical states, **from sub-Poissonian light to multi-mode entanglement**, all using a single technological platform of integrated waveguide networks with engineered loss.
- We will build working prototypes and develop the technological foundation for the applications of the PhoG sources in advanced **optical imaging and metrology**.

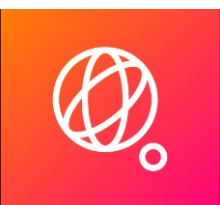
PhoG:
family of
quantum
sources



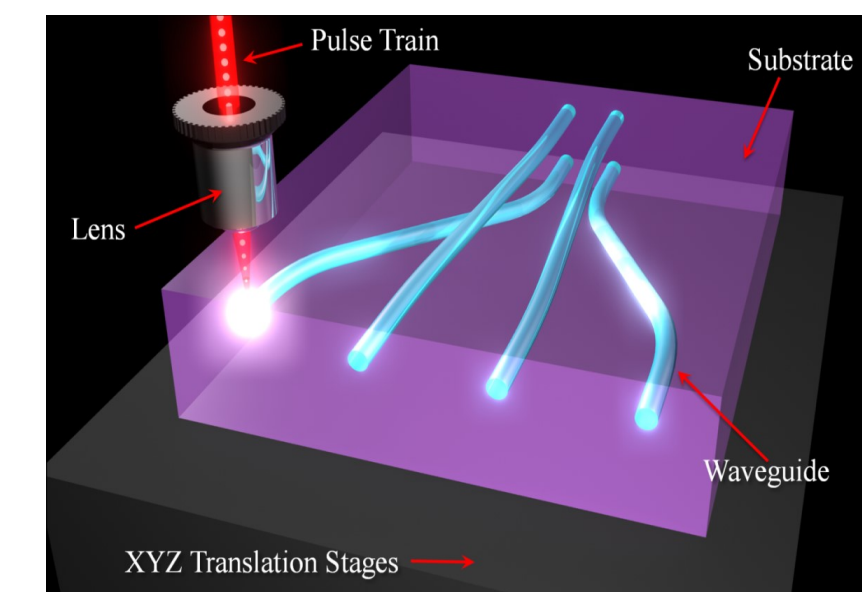
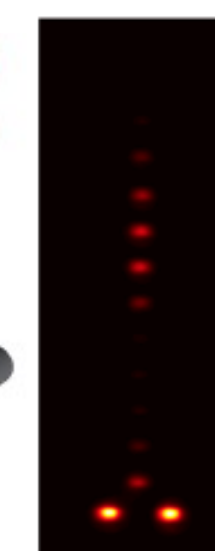
Quantum state characterization; Time-multiplex detection; Nonlinear waveguides χ (2)



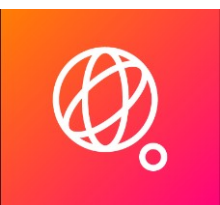
Optically-pumped space
Cesium clock at CSEM:
PhoG applications in
metrology



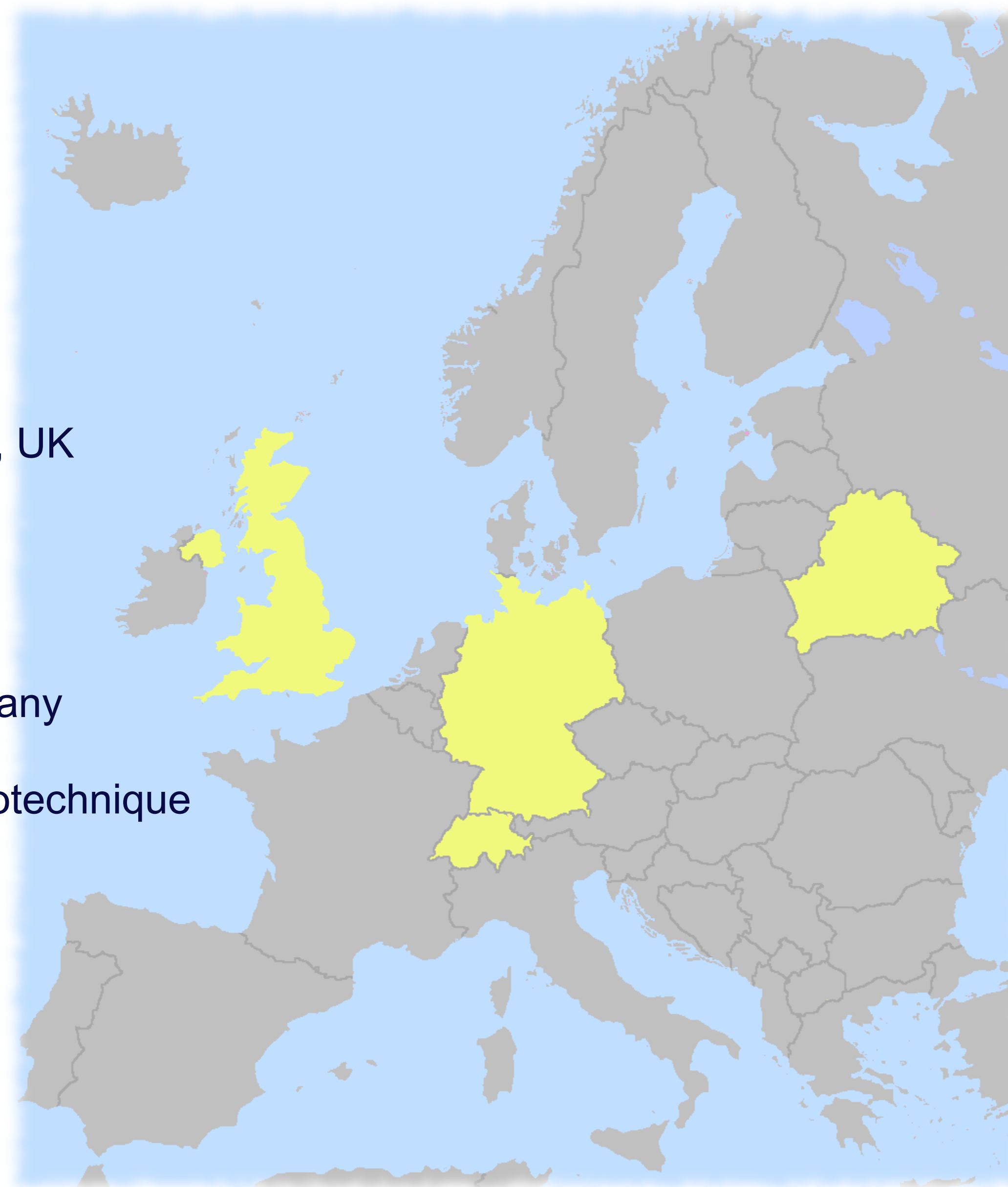
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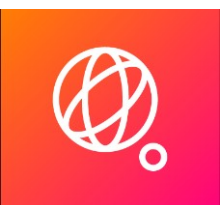


- **Why – Objectives and Addressed challenges**
 - **sub-Poissonian statistics + multi-partite entanglement** for range of applications: **deterministic** source
 - applications: **metrology & imaging, quantum simulations, “cheap” quantum source** for Qtechnologies
- **How:** Unique light propagation regimes using **coherent diffusive photonics** operating with **dissipatively coupled waveguide networks** in linear and non-linear glass materials (laser inscribed waveguide systems).
Decisive: the **linear and nonlinear engineered loss**.
- **Expected deliverables:**
 - integrated photonic sources, in well-defined modes, **with user-selected quantum properties**
 - optical equalizer and quantum networks based on management of quantum correlation flow in waveguide arrays
 - **entanglement-enhanced imaging** with benchmarked improvement in resolution and SNR
 - **atomic clocks** with entanglement-enhanced frequency stability
 - assessment of **technology benefits & roadmap** for metrology applications and TRL expansion.



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