



SENSORS
AND DEVICES



NQSTI

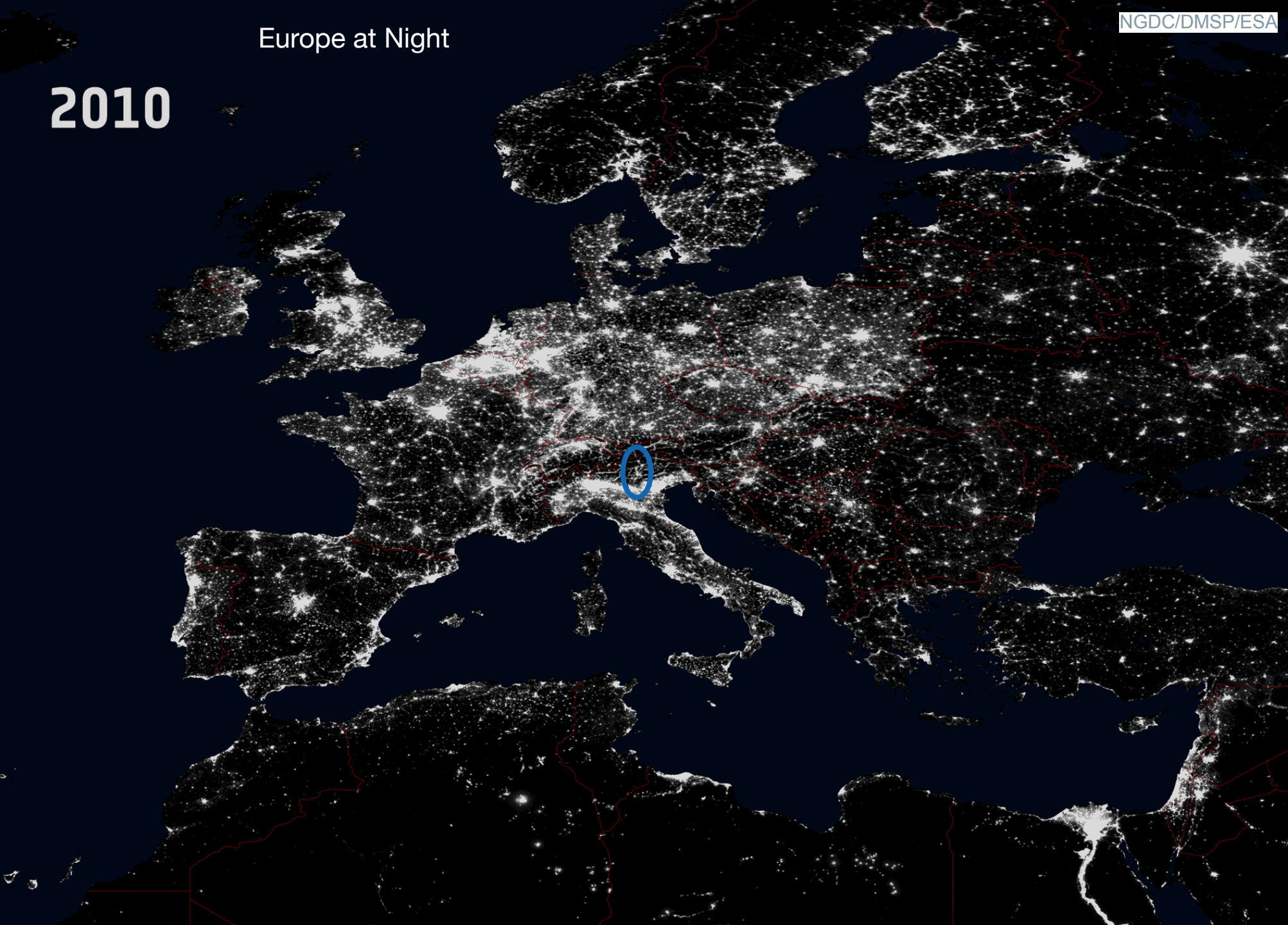
National Quantum Science
and Technology Institute

Welcome to the workshop on Superconducting Devices for Quantum Optics and Quantum Simulations

Prof. Richard Hall-Wilton


FBK-Sensors&Devices Centre director

2010



- Trento is on one of the main north - south Europe routes
- Region close to Austria and Switzerland

Trade routes and borders are drivers of ideas and creativity



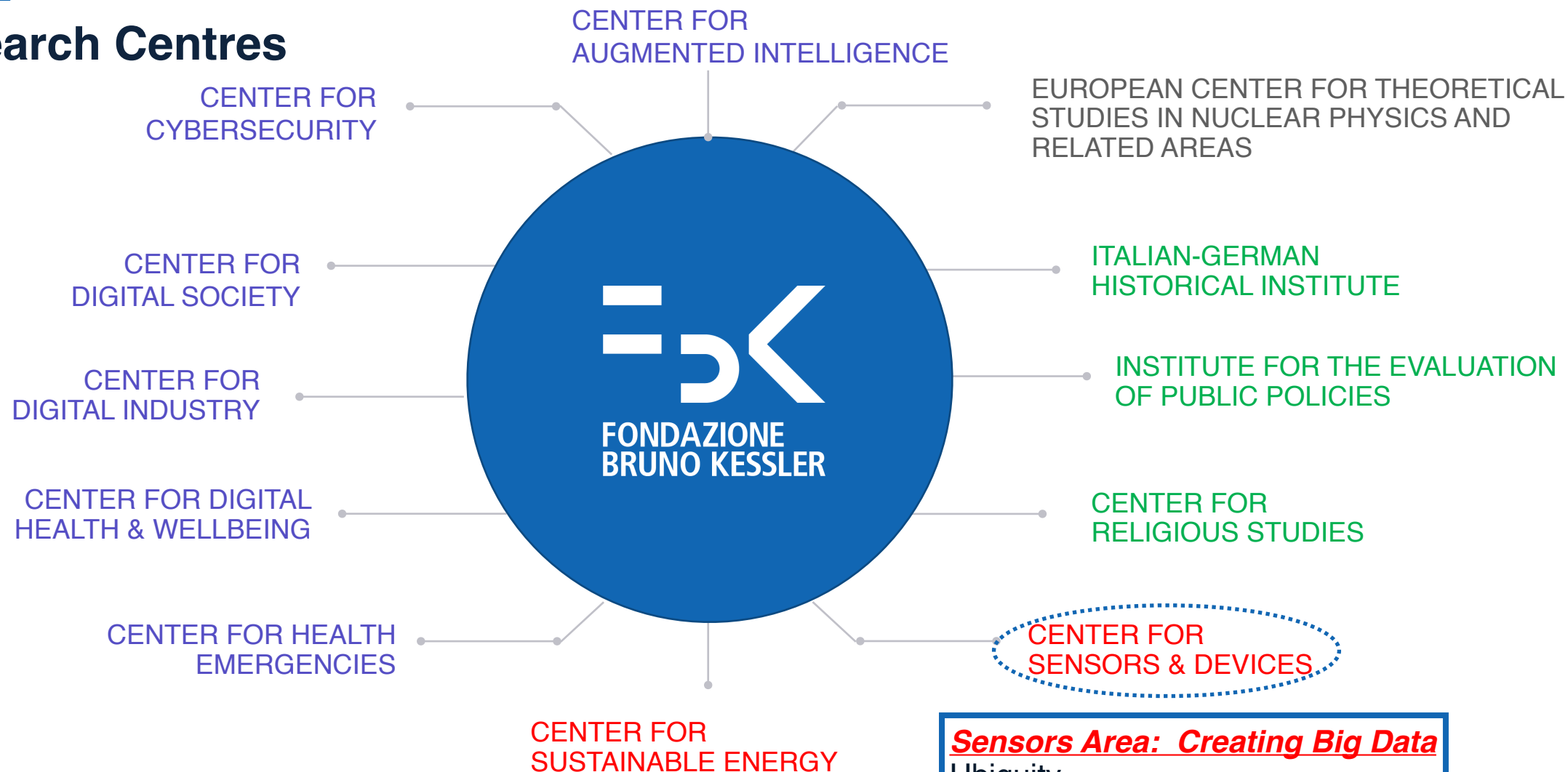
How research works ...

You work in many collaborations

Established, stable, successful interdisciplinary environment
increases the probability of productive interactions

FBK

Research Centres



FBK is ISO9001 & ISO 27001 certified

Sensors Area: Creating Big Data

Ubiquity
Data quality
Big data for AI



sensors

a device that is used to record that something is present or that there are changes in something



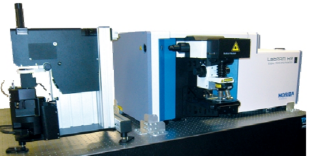
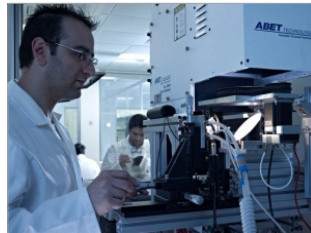
devices

an object or machine that has been invented for a particular purpose: an electronic device

Cambridge English dictionary

FBK Sensors&Devices Centre: Micro and Nano Fabrication Facility

IPCEI1: 1200m² moving to >2000m² semiconductor ISO4-6 cleanrooms



6" Microfabrication Area

Clean Room Detectors

700 m²; Class 10/100 0,8 um CMOS pilot line: Ion Implantation, Oxidation, Diffusion, RIE, Deep RIE (silicon and oxide), Lithography (stepper 0.35 um and mask aligner), metal sputtering, optical profilometry

Clean Room MEMS

500 m² Class 100/1000 diffusion, lithography (mask aligner), wafer bonding, electroplating, Si bulk micromachining, metal evaporation, RIE, mechanical and optical profilometry,

Clean Room 3D

towards 3D integration with through silicon vias (sensor + readout chip), thinning.

Testing Area

300 m² manual parametric testing, automatic parametric/functional testing, optical testing (spectral responsivity, quantum efficiency), solar cells efficiency characterization, gas and pressure sensors test benches

Integration Area

100 m² clean room Class 1000 Microassembly station; screen printing, bonding (ball & wedge bonder), Shear-Pull Tester, reflow oven, CNC micro-mill, pick and place

Nano- and Micro- Analytical Facility

Nano Ramen, FIB-SEM-EDX-EBSD, D-SIMS, TOF-SIMS, XPS, AFS, XRD/XRF



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NextGenerationEU



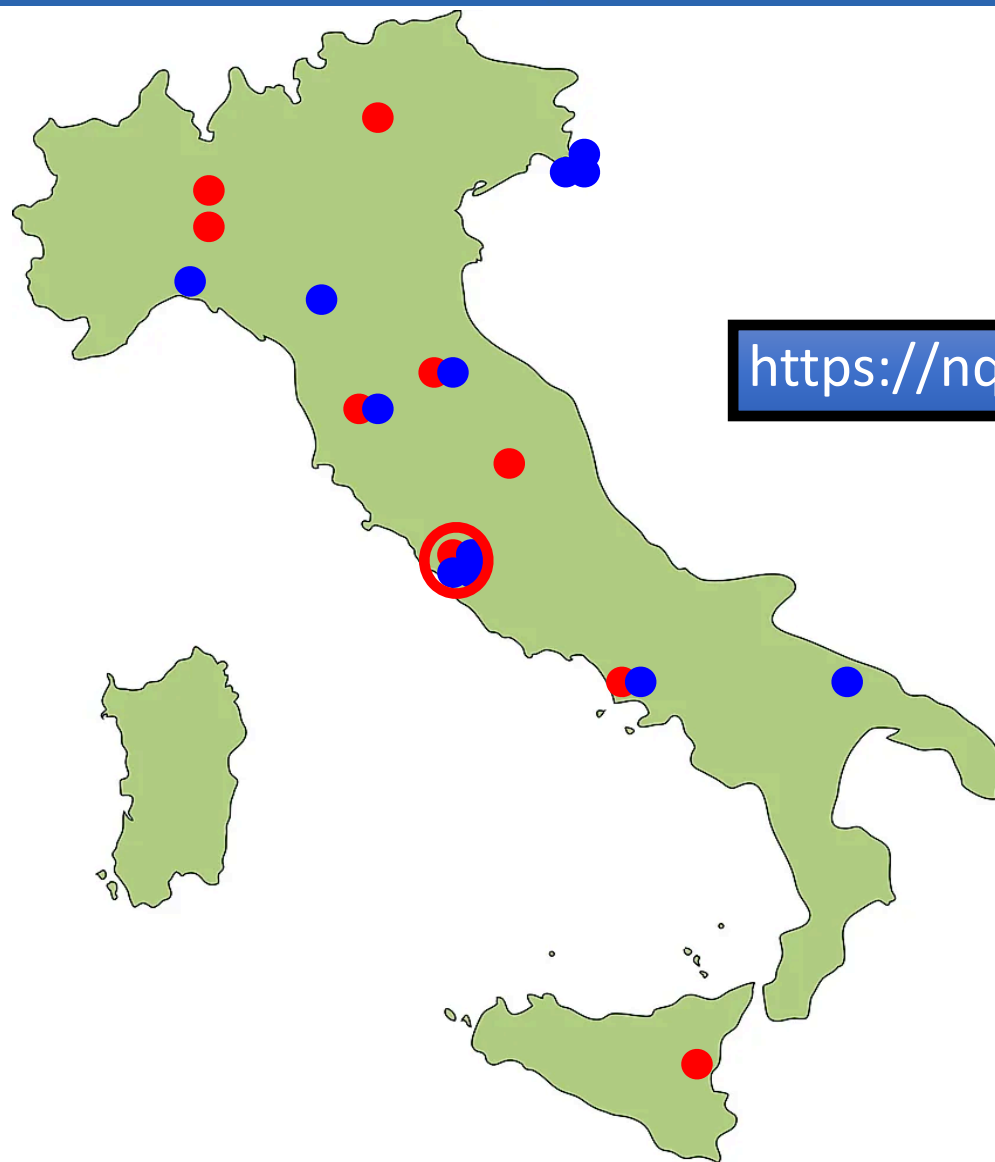
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dell'Università
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PIANO NAZIONALE
DI RIPRESA E RESILIENZA



NQSTI
National Quantum Science
and Technology Institute



<https://nqsti.it/>



20 Institutions



**Researchers
322**



**MUR funding
116 MEuro**



**New RTD
104**

Italian National Quantum Science and Technology Institute

Twofold role:

- Provide technologies to industrial and academic partners
- Participate in excellent research

5 main areas/platforms :

- Single photon detectors
- Integrated photonics & Quantum Simulators
- Superconducting devices
- Colour centres in diamond and Si and SiC
- Quantum Random Number Generators

Aim:

- Enjoy the workshop!
- Enjoy the location!
- Future impact on this exciting topic ...

<https://sd.fbk.eu/en/>