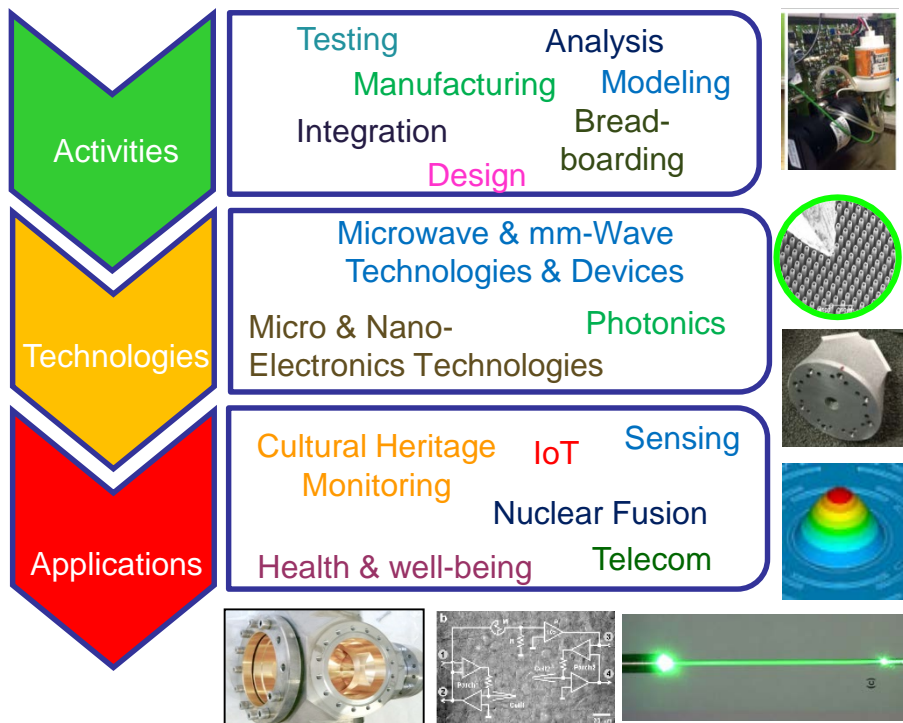# Project Area 1: Devices and Systems for ICT

Objective: The objective of the PA is to boost the development of new components and technologies available to ICT applications, including next-generation 5G terrestrial and satellite networks, Internet of Things (IoT), environmental monitoring, diagnosis of civil structures and cultural heritage, Industry 4.0, automotive, well-being, and healthcare. In this context, the activities are aimed at increasing the Technology Readiness Level (TRL) of the components/systems/processes involved, from the concept and formulation (TRL 1-2) to the experimental verification in the operational environment (TRL 7), through proof-of-concept and bread-boarding (TRL 3-5).

Approach: The development of new components and systems encompasses several activities, among which are concept formulation, analysis, modeling, design, manufacturing, integration, and testing. These actives are implemented, in close collaboration with academia and other research entities, for three main areas, i.e. photonics, microwave and millimeter-wave technologies and devices, and micro and nano-electronics technologies. Product manufacturing and performance assessment are carried out in high-tech laboratories.

Depending on the specific technology maturity, the activities at CNR are carried out within the framework of programs funded by agencies (European Commission, European Space Agency, Italian Space Agency, Fusion for Energy, MISE, MIUR) for more fundamental researches, and industrial contracts with national companies for industry-driven activities.

Activities
- Testing
- Analysis
- Manufacturing
- Modeling
- Integration
- Bread-boarding
- Design

Technologies
- Microwave & mm-Wave Technologies & Devices
- Micro & Nano-Electronics Technologies
- Photonics

Applications
- Cultural Heritage Monitoring
- IoT
- Sensing
- Nuclear Fusion
- Health & well-being
- Telecom

Scientific Impact/Results: The PA is cross-cutting by nature, allowing for the technological development of ICT products to be used in many applications. As a consequence, the PA proves to be the cornerstone for several activities carried out in other PA's, such as Earth Observation based on radiometric imaging, cultural heritage monitoring, healthcare, and internet of the future. The CNR units participating in this PA play an important role in supporting the national industry by boosting knowledge transfer in fields relevant to many application domains.