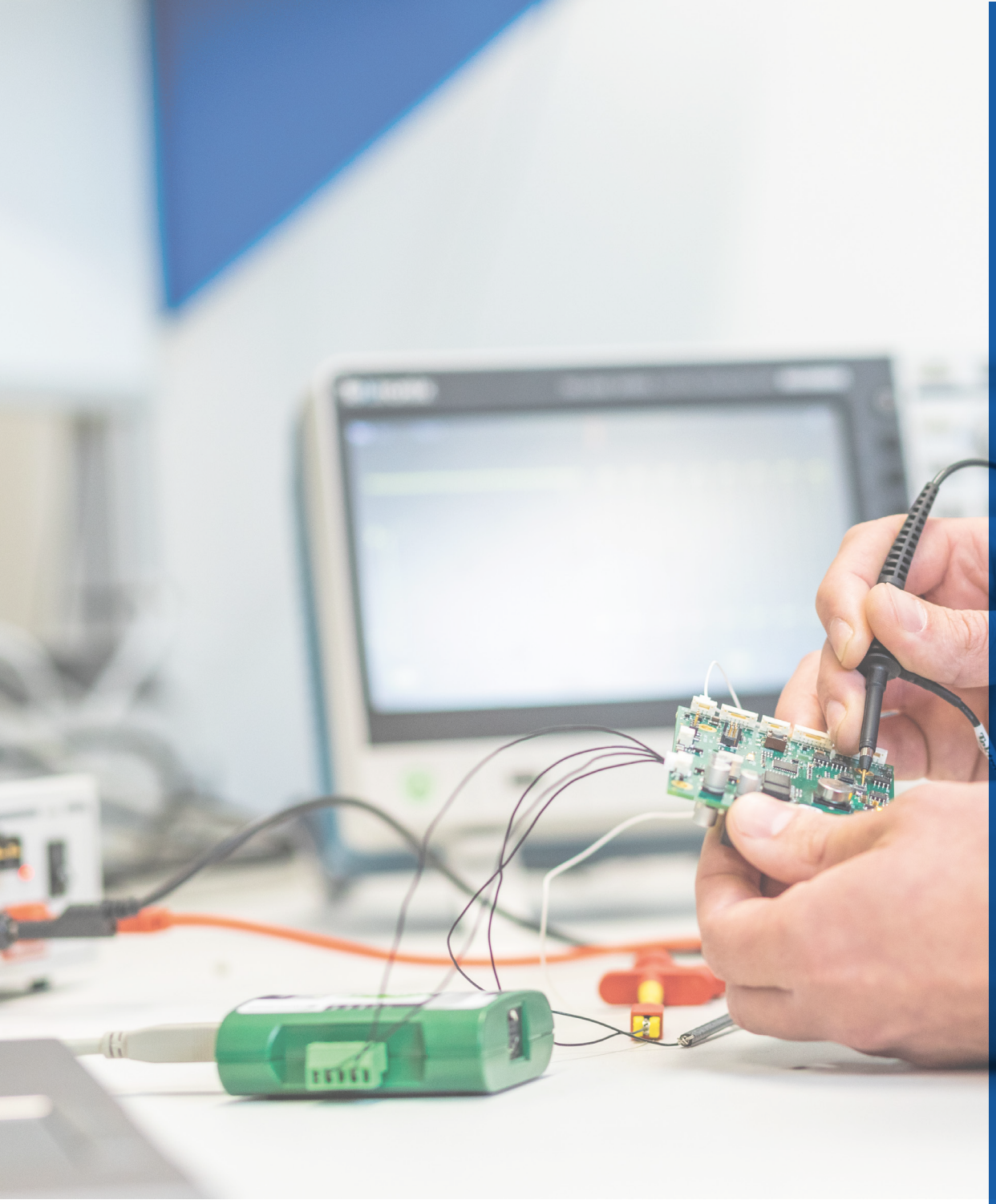

PALANTIRI

PALANTIRI AIMS TO:

Microwaves are widely used to transmit information, but the limited rangerequires a conversion into optical telecom signals to travel longer distances. Currently, this conversion is highly inefficient and coherence between themicrowave and optical signals is easily lost. Towards the development ofquantum computer networks, the preservation of coherence between microwaves (at which these machines work) and the optical data transmission is a prerequisite. Palantiri aims to create a microchip that uses a freestanding Yttrium Iron Garnet resonator to convert microwave signals into optical signals. The idea is to combine microwave photons, acoustic phonons, magnons and optical photons into a single platform to build a high-efficiency, coherence conserving, device for quantum transduction.

DEMCON'S ROLE

DEMCON TSST will be fabricating Yttrium Iron Garnet thin films for the project, by using Pulsed Laser Deposition. The challenge is to fabricate these crystalline oxides on 4 inch silicon wafers, in order to facilitate the further processing into the microchip. Upscaling towards the wafer size will facilitate the industry-uptake after the project, by proving that the fabrication can be performed on industry-relevant substrate sizes.

OBJECTIVES

To deliver a proof of principle on-chip analog coherent frequency converter with high efficiency.

IMPACT

- The delivered phase-sensitive device will provide the breakthroughs needed to achieve a radical expansion of the connectivity capacity of a backhaul network for enabling high-speed internet access for everyone from any location.
- Provide the elementary brick to build the quantum-ready internet infrastructure of the future.

FIGURES

- 3.3M euro ESTIMATED PROJECT COST
- 42 months duration
- 7 European partners

PROJECT PARTNERS

DEMCON | TSST

ICN2 Institut Català de Nanociència i Nanotecnologia

cnrs

MARTIN-LUTHER-UNIVERSITÄT HALLE-WITTENBERG

MAX PLANCK INSTITUTE FOR INTELLIGENT SYSTEMS

cea

TU Delft

TU Delft

TU Delft

Funded by the European Union

project-palantiri.eu