

QUANTERA

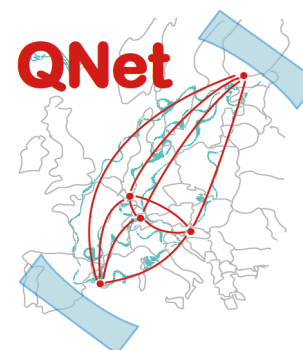


QuantERA Research Funders: Call 2023



CoQw@D-5

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CoQQualDis

Collective Quantum Phenomena in Dissipative Systems:
Towards Time-crystal Applications in Sensing and Metrology

Referencia: PCI2024-153446



Areas of research



Duration

September 2024

August 2027

187.500 euros
→ 150k +37,5k



Consortium



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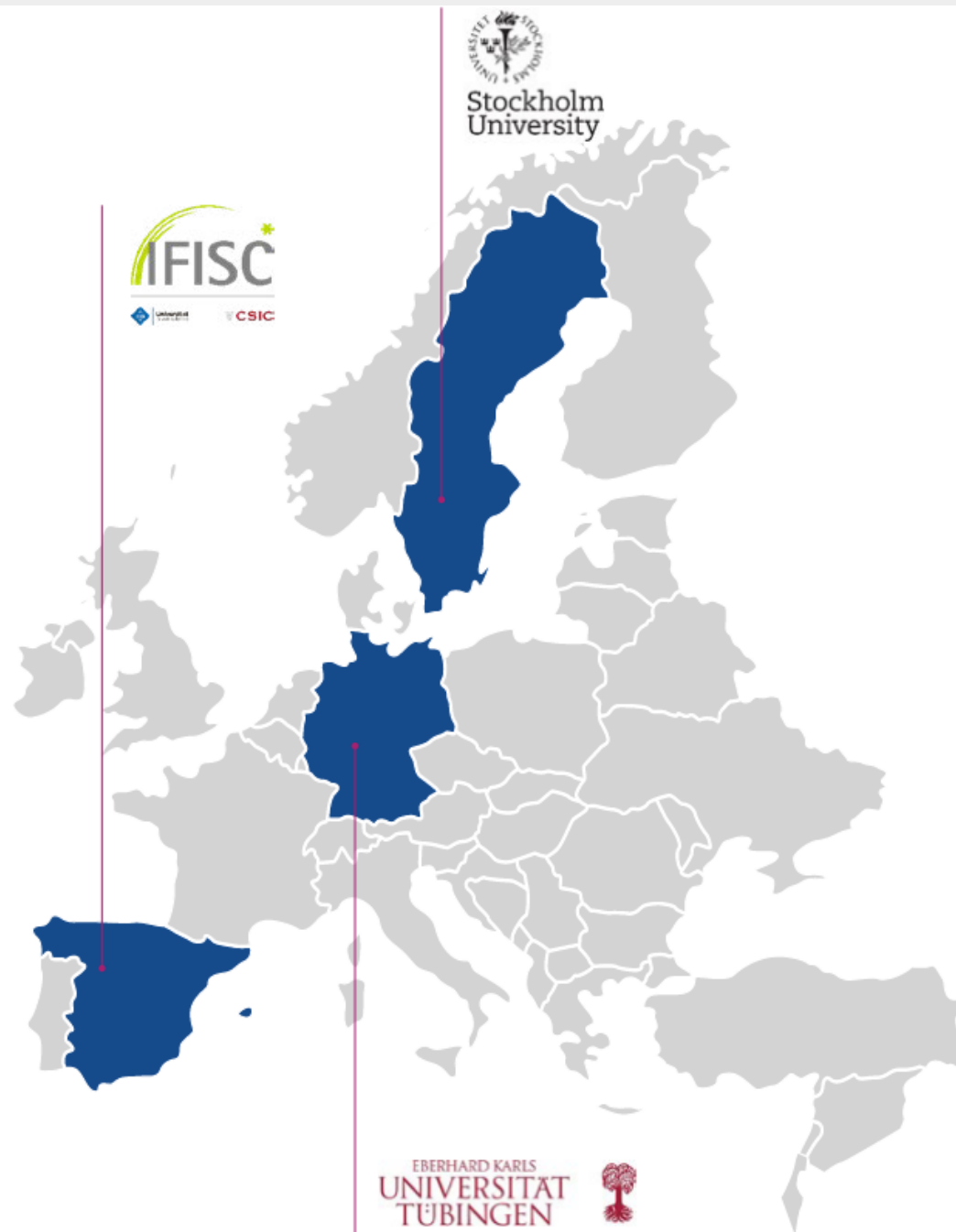


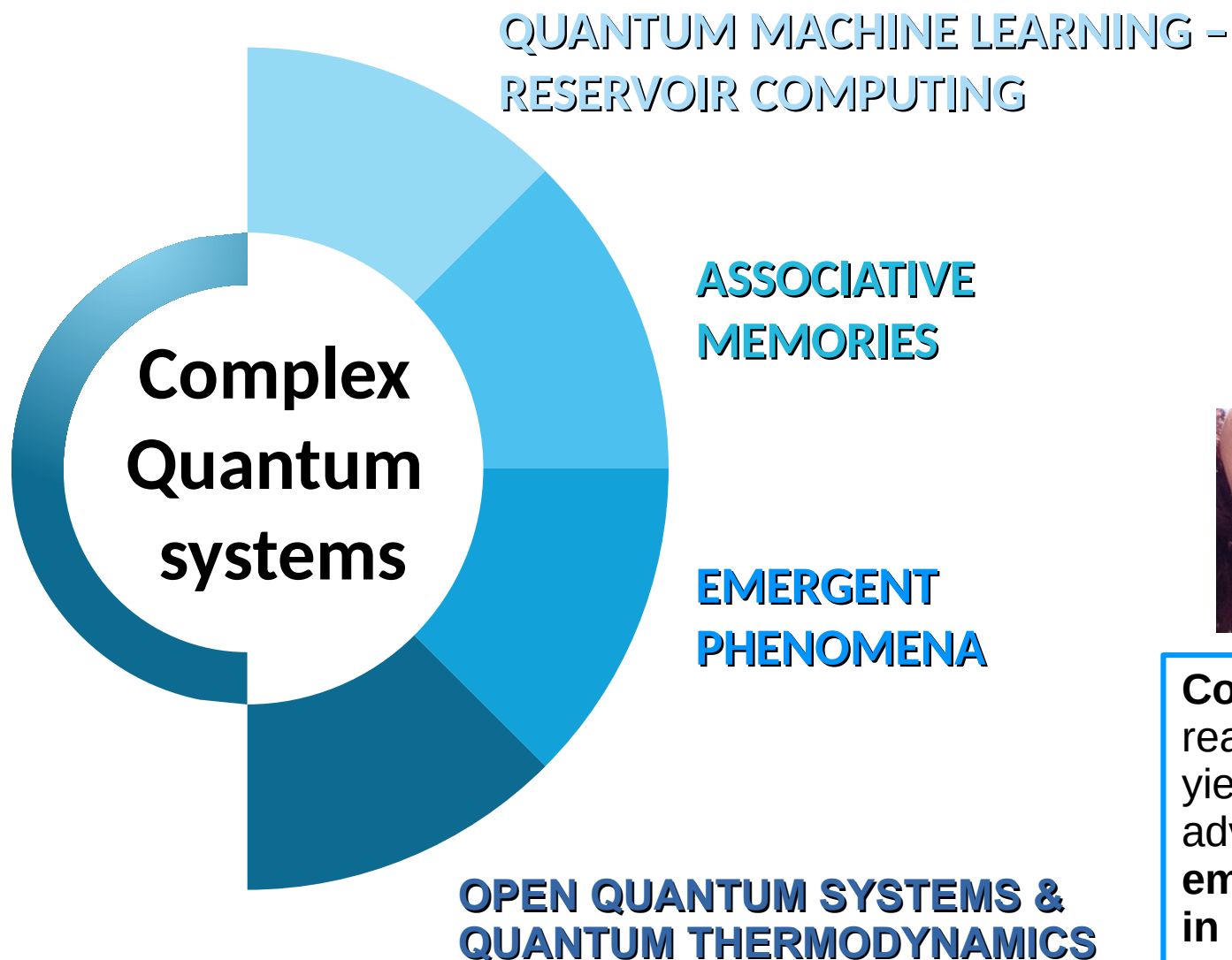
Funding organisations

✦ Germany: DFG

✦ Sweden: VR

✦ Spain: AEI





CoQuaDis seeks to identify and realise quantum **resources** yielding a possible quantum advantage by **exploiting emergent collective phenomena** in open systems.

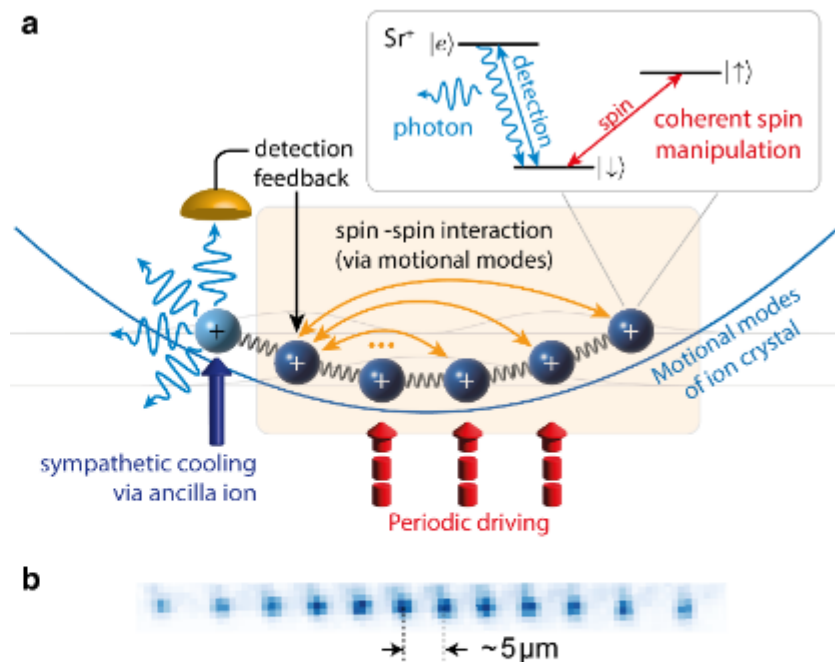


Fig. 1. Realisation of a spin-boson model in a trapped ion system. (a) Trapped ions forming a Wigner crystal at low temperatures. (b) Camera image of an experimental realisation of a linear ion string with 12 ions (Stockholm University).

- Modeling of SU experiment: consistent ME
- Time-crystals, synchronization and QRC
- Monitoring and control of time-crystals
- Parameter estimation, quantum clocks & time crystals (QRC?)

Out-of equilibrium dynamics → time-crystals

- Discrete time-crystals: breaking discrete translational symmetry in time in periodically driven systems as subharmonic oscillations [1].
- Continuous time-crystals in open quantum systems, breaking continuous time translational symmetry, as for so-called boundary time-crystal [2]

[1] J. Zhang et al., C. Monroe, Nature 543, 217 (2017)

[2] F. Iemini, A. Russomanno, J. Keeling, M. Schirò, M. Dalmonte and R. Fazio, Phys. Rev. Lett. 121, 035301 (2018)