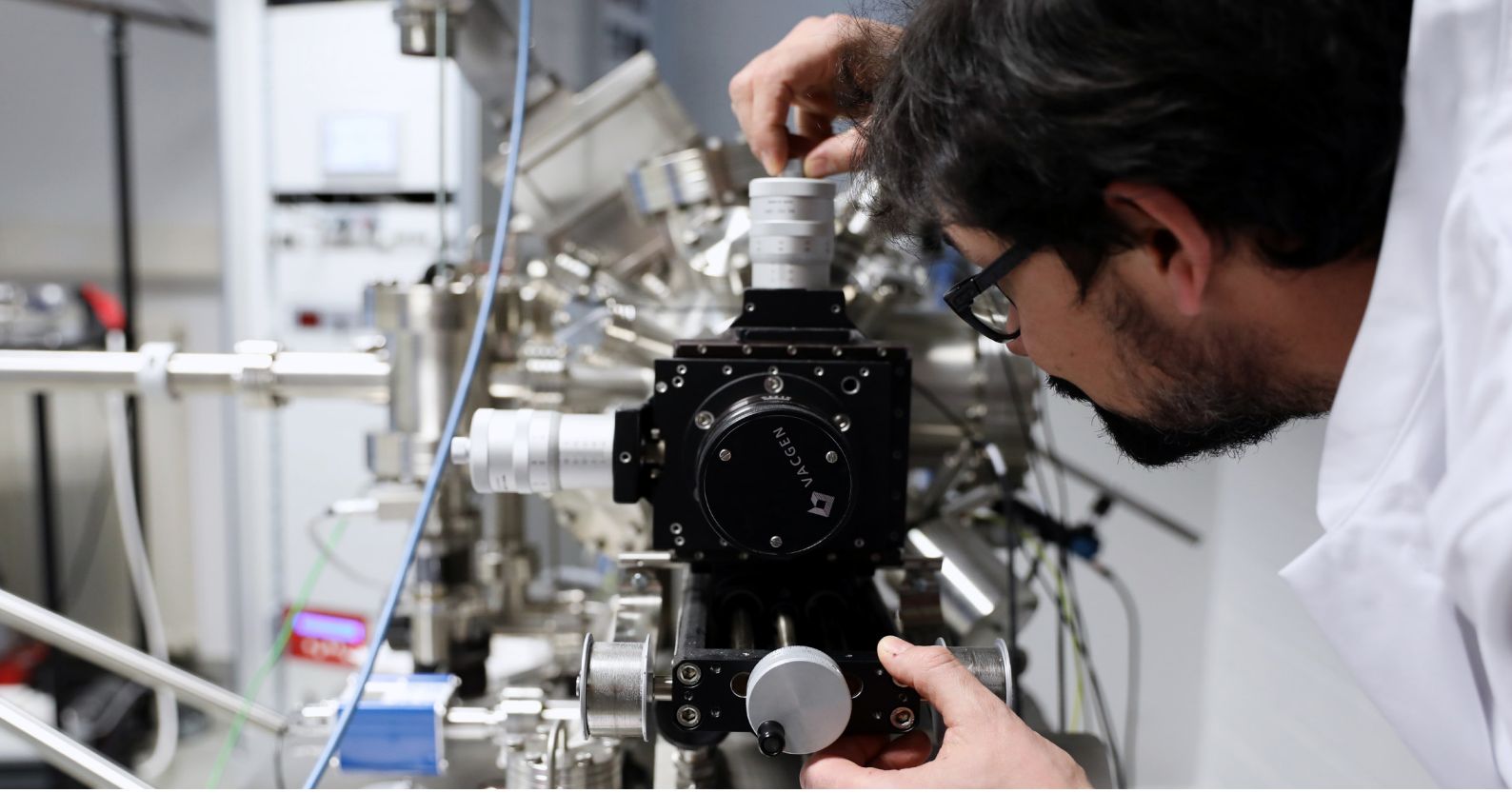

DEPARTMENT OF PHYSICS AND MATERIALS SCIENCE (DPhyMS)

The Department of Physics and Materials Science has an excellent international reputation for its research on a wide range of fundamental and applied topics. The joint efforts of experimental and theoretical physicists have resulted in multiple breakthroughs published in top-level international journals and numerous prestigious grants. Members of DPhyMS are involved in fruitful collaborations, such as joint projects launched with LCSB, and a long-standing initiative with LIST to establish a strong pole for materials research in Luxembourg. We also continuously foster exciting interdisciplinary research collaborations on topics related to machine learning, artificial intelligence and big data analytics.

CONTACT
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MEMBERS

- 21 professors
- 14 research scientists
- 120 post-docs and doctoral candidates
- 15 technical and administrative staff

FUNDING AND COLLABORATIONS

- €30 million acquired in new research projects in 2020-2022
- 8 FNR ATTRACT fellows since 2010
- 4 ERC grand holders, including one Advanced
- 3 ERC proof-of-concept grants and Luxembourg's first EIC grant

PUBLICATIONS IN 2021

- 150 peer-reviewed articles in scientific journals

Research areas

The department (DPhyMS) carries out research activities around five thematic axes:

PHOTOVOLTAICS, SUSTAINABLE ENERGY

We investigate the physics of materials and quantum mechanical systems that are used in the conversion of renewable energy sources like sun and wind. The research stretches from the fundamental understanding to the development of devices. We are proud to combine exciting questions in fundamental physics with societal impact.

QUANTUM SCIENCE & TECHNOLOGY

This cluster is composed of theory groups and experimental groups that jointly span a range of topics in quantum information science, many-body physics, statistical mechanics and machine learning, quantum chemistry, and light-matter interactions for the advancement of emergent quantum technologies.

SOFT & LIVING MATTER

This cluster studies the physics of partially ordered and responsive materials, with structures often arising without external assistance (self-assembly and self-organization), in living systems as well as in inert materials. Our research comprises theoretical and experimental approaches, addressing problems that range from curiosity-driven fundamental research into why certain structures and peculiar behaviors arise in soft and living systems, to applied aspects where we explore means to improve society and environment through understanding adaptive, responsive or otherwise smart active materials.

SPECTROSCOPY & FUNCTIONAL MATERIALS

This cluster targets the investigation of novel materials in order to unveil the fundamental processes that govern and determine the properties of matter. The research groups employ a wide range of cutting-edge spectroscopic techniques in order to understand, design and control materials with important applications in future technology. The experimental activity is accompanied by advanced modeling of the fundamental phenomena to obtain a complete picture of the functioning mechanisms of materials and related devices.

STATISTICAL PHYSICS & MACHINE LEARNING

This cluster uses and develops statistical physics and machine learning to (i) design materials that can undergo dramatic and controllable changes in their properties (e.g. magnetic, optical, rheological), (ii) develop new methodologies to accurately compute long range intermolecular forces, (iii) understand collective behaviors in interacting living systems (e.g. molecules, cells, animals, populations), (iv) design efficient and reliable quantum and classical computing schemes.