CEMPI

1. Excellence and originality of research and education

1.a. Achievement of the proposed milestones, potential evolution and compliance

with the recommendations made in the 2015 milestone report

The Labex CEMPI brings together 173 faculty across institutions in Lille to conduct fundamental and applied research and training, stretching across mathematics and physics, with impact on technology development.
Scientific output, international recruitment and external funding are all on a strong upwards trajectory.

1.b. Quality of the project presented for the forthcoming contract period, including its expected scientific and educational added value and its international visibility

New research and industrial opportunities, and the recruitment of new research leaders have led to a restructuring into three interdisciplinary focus areas: Dynamics, Topology and Applications, Biology/Stochastic Modelling/Data Science.
There is strong evidence that this is already enabling new synergies and further broadening and deepening the academic power and impact of the LABEX. Regarding topological insulators, interaction with the theory of operator algebras which goes beyond classical topological invariants would be desirable.

The emerging Graduate School `Deep Tech', part of the `Digital World' hub, will strengthen the training programme with significant benefit to the region.

1.c. Social, cultural and economic impact

The project has a high social, cultural and economic impact through the training of researchers with a deep understanding of mathematics and physics, and their interaction with other fields such as biology, medicine and computer science. Also the team has established an impressive number of industrial collaborations, in particular in the areas of photonics and fibre optics.

2. Scientific structuration promoted by the project

2.a. Strengthening of the scientific partnerships and educational dynamics of the concerned site

The restructuring of the research themes aligns well with high-priority societal challenges of the French and European research strategies.

2.b. Ability to be part of and consistent with the strategy of its academic institutions at regional and/or national scale

The project is well aligned with the overall strategies of the involved institutions and regional as well as national activities.

2.c. If relevant, ability to have a structural effect at regional, national or European levels in particular through the development of equipment/platforms (e.g. national roadmap of research infrastructures)

CEMPI has formed two joint laboratories in the area of fibre optics. One with the multinational company Prysmian/Draka and one with CEA/CESTA which operates the laser MegaJoule in Bordeaux, one of the most powerful inertial confinement facilities.
CEMPI will also coordinate the development of three startup companies in optics and software development.

3. Overall evaluation

3.a. Major strengths

- Strong individual scientific achievement reflected by, among others, 4 ERC grants, invitations to top conferences, prizes and publication in top journals in mathematics, physics and other fields.
- Interdisciplinary interaction (12% of the publications are interdisciplinary).

3.b. Major weaknesses

No identified weaknesses.

3.c. Summary opinion and recommendations

A strong proposal on a dynamic upwards trajectory. It should be continued.

Proposed to be continued