



**CEMPI**

## 1. Noteworthy productions

### 1.1. Outstanding progress regarding research

The mathematicians in this LABEX discovered a means to translate abstract harmonic analysis to the derivation of quantum error correcting mechanisms. It is noteworthy that this work included theoretical mathematics published in a main-line physics journal. This is an example of how this LABEX is working to develop serious research connections between an existing mathematics lab and an existing physics lab.

Other very relevant research has been developing new stable waveforms for model optical channels. This should be directly relevant to French communications industry.

### 1.2 Striking progress in other “Labex” fields

#### a. Formation

There were four existing masters programs to which this LABEX is now actively recruiting students. They are working to make quick admissions and funding decisions, and taking advantage of their foreign faculty in accurately evaluating the applications of foreign students.

#### b. Valorization

The relations with partners in medical and communications industry have put this LABEX in a position to start enhancing the local economy. There are good opportunities now for mathematicians to provide the tools for speedier design of multi-structured optical fibres; multi-structured fibres being required to satisfy the demand for higher data throughput.

#### c. International (outreach, attraction, networking...)

The LABEX CEMPI has been recruiting, with some success, postdoctoral fellow and short-term visiting researchers from other countries. The researchers involved in CEMPI are frequently publishing with coauthors in a variety of countries.

## 2. Added-value resulting from labelling and funding as a “Laboratoire d’Excellence”

This LABEX has already gathered significant funding from other sources, including industry. Moreover, local hiring into permanent positions seems to be coordinated with the goals of the LABEX.

## 3. Main weaknesses

### 3.1. Main weaknesses that might require corrective actions regarding the research performed in the “Labex”

No apparent weakness in this area.

### 3.2 Main weaknesses that might require corrective actions regarding other fields of the “Labex”

#### a. Formation

No apparent weakness in this area.

#### b. Valorization

No apparent weakness in this area.

#### c. International (outreach, attraction, networking...)

It is not clear that sufficient international contacts have been made to allow for a good flow of international professors to visit. The partnership with the Fields institute will be important in this regard, and individual researchers may need to travel more to conferences to make the personal research connections needed to increase the pool of interested visitors.

#### 4. “Labex” contribution to structuring the gathered scientific strengths (governance, synergy, common scientific programming, visibility...)

There seems to have been a solid effort at coordinating research efforts.

#### 5. Beyond scientific results specifically obtained by the “Labex”, give an assessment on its contribution to the development, outreach and overall visibility of the concerned institutions and of the corresponding site.

The funding obtained from industry is a clear sign of improved visibility.

#### 6. Overall opinion and recommendations

Overall, LABEX CEMPI is doing a good job in two essential areas. The first area is in making a coordinated effort to get more mathematicians active in interdisciplinary research relevant to local industry and academic laboratories. The second area is in boosting the number of graduate students in their masters program. They are also retaining more masters students to stay for the PhD program. Their efforts to engage industry are expected to have a substantive impact on the local economy and help their graduates find mathematically relevant employment.

The LABEX CEMPI is playing an important role in the IDEX Lille bid to unify the universities in the Lille region. We were very impressed that this was the only presentation to include a SWOT analysis.