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A NOvel Architecture for a photonics LIquid State machine

Fact Sheet

Project Information

NOVALIS

Grant agreement ID: 275840

Project closed

Start date
1 July 2011

End date
30 June 2013

Funded under
Specific programme "People" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)

Total cost
€ 167 065,60

EU contribution
€ 167 065,60

Coordinated by
AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS
🇪🇸 Spain

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Objective

"Reservoir computing represents a new paradigm in information processing, based on the insight that computational power can emerge from a system's complexity. The project's objective is to develop a novel photonic approach to reservoir computing. The experimental scheme will implement the concept of a liquid state machine (LSM), a sub-category in the neuro-inspired framework of reservoir computing. It has been shown that LSMs posses universal and highly efficient computational properties. Experimental realizations of liquid state computing are scarce, regardless of highly promising simulations. This project's goal is a new photonic approach towards a LSM: a VCSEL array will be embedded in a cavity, delay-coupling several laser diodes. Consequently, a complex network can form, consisting of the connections between individual diodes. This delay network acts as the reservoir. Compared to individually coupled elements this approach has major advantages, comprising the chance of truly parallel computing, scalability and flexibility. Starting with a small scale demonstration using few coupled lasers, the experiment will extend to VCSEL arrays with potentially many lasers. Spatial filtering inside the cavity might offer a practical implementation of plasticity and network motif concepts, enabling a dynamical adaption of coupling strength and topology.
The experienced researcher will extend his background in information processing concepts. The ER will be trained in these novel concepts and in experimental techniques related to photonics technologies and complex systems. This is complemented by an attractive training program of secondary skills. Therefore, the proposed project adds to a highly competitive and promising profile, supporting a future position of professional maturity. Both, host organization (IFISC) and mentoring researcher (Prof. Fischer) provide a unique environment for realizing the proposed project, as well as supporting the experienced researcher."

Fields of science (EuroSciVoc) ⓘ

natural sciences > computer and information sciences > **artificial intelligence**

natural sciences > mathematics > pure mathematics > **topology**

natural sciences > computer and information sciences > data science > **data processing**

natural sciences > physical sciences > optics > **laser physics**

Programme(s)

FP7-PEOPLE - Specific programme "People" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)

Topic(s)

FP7-PEOPLE-2010-IEF - Marie-Curie Action: "Intra-European fellowships for career development"

Call for proposal

FP7-PEOPLE-2010-IEF
See other projects for this call

Funding Scheme

MC-IEF - Intra-European Fellowships (IEF)

Coordinator

AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS

EU contribution

€ 167 065,60

Total cost

No data

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Region

Comunidad de Madrid > Comunidad de Madrid > Madrid

Activity type

Research Organisations

Links

Contact the organisation ↗   Website ↗
Participation in EU R&I programmes ↗
HORIZON collaboration network 🤝

Last update: 26 May 2022

Permalink: https://cordis.europa.eu/project/id/275840

European Union, 2025