POLITECNICO DI MILANO

PhD in FISICA / PHYSICS - 41st cycle

THEMATIC Research Field: IMPLEMENTATION OF ARTIFICIAL INTELLIGENCE ALGORITHMS ON CONTINUOUS VARIABLES QUANTUM COMPUTERS

Monthly net income of PhDscholarship (max 36 months)
1300.0 In case of a change of the welfare rates during the three-year period, the amount could be modified.

Context of the research activity	
Motivation and objectives of the research in this field	BVTech is a major Italian player in the field of cybersecurity. Anomaly detection is a domain of interest in the field. Quantum computing carries advantages like speed-up already with specialized hardware such as Gaussian boson sampling in photonic quantum hardware, suitable for instance for graph similarity The full development of quantum computing methods based on artificial intelligence from the compiling layer to the algorithm will enable the mature exploitation of quantum computers for cybersecurity tasks.
Methods and techniques that will be developed and used to carry out the research	The work will take advantage of continuous variable quantum computing approach, measurement based quantum computing, quantum compiling for the photonic quantum hardware, design of optimized circuits for cybersecurity tasks defined by BVTech SPA, including artificial intelligence methods. The work will be carried out at the I3N Laboratory at Polifab in collaboration with Quantum Intelligence Lab of the CNR-IFN.
Educational objectives	The activity aims at training the PhD candidate to develop control methods of photonic quantum computers, to exploit artificial intelligence methods over a photonic quantum computer and develop algorithms for cybersecurity tasks.
Job opportunities	Quantum computing applied to security opens the chance to work in quantum computing companies, international institutions and academia.

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Composition of the research group	0 Full Professors 2 Associated Professors 0 Assistant Professors 5 PhD Students
Name of the research directors	Prof. Giorgio Ferrari; Prof. Enrico Prati

Contacts
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Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents	--

Scholarship Increase for a period abroad	
Amount monthly	650.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
Educational activities (purchase of study books and material, funding for participation to courses, summer schools, workshops and conferences). Financial aid per PhD student per 3 years: max 5300,25 euros per student. ***Teaching assistantship***:There are various forms of financial aid for activities of support to the teaching practice.The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations. **Computer and desk availability**: individual use computer and desk.