POLITECNICO DI MILANO

PhD in INGEGNERIA DELL'INFORMAZIONE / INFORMATION TECHNOLOGY - 41st cycle

Research Area n. 1 - Computer Science and Engineering

THEMATIC Research Field: QUANTUM COMPUTING FOR THE OPTIMIZATION OF POWER GRIDS

Monthly net income of PhDscholarship (max 36 months)
1500.0 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	Quantum computing, a field that leverages the principles of quantum mechanics to perform computations, holds extraordinary potential to revolutionize various industries. Among these, its implications for energy optimization are particularly compelling. As global energy demands rise alongside the growing computational requirements of technologies like artificial intelligence, the need for innovative solutions becomes critical. Quantum computing can reduce energy consumption significantly in two major ways: optimizing machine learning processes in data centers and tackling complex problems beyond the reach of current supercomputers.
Methods and techniques that will be developed and used to carry out the research	To achieve the above objectives, several tools and techniques can be leveraged within the realm of quantum computing. Quantum algorithms such as Quantum Approximate Optimization Algorithm are particularly suited for optimization tasks in energy systems. Additionally, hybrid approaches combining classical and quantum computing can enhance computational efficiency, utilizing the strengths of each methodology. These emerging technologies, when paired with robust data analytics and machine learning frameworks, can unlock unprecedented opportunities in energy distribution and optimization.

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Educational objectives	Master the design of quantum computing applications
Job opportunities	Companies developing quantum hardware or softwareCompanies in the energy domain.
Composition of the research group	1 Full Professors 2 Associated Professors 1 Assistant Professors 5 PhD Students
Name of the research directors	Prof. Paolo Cremonesi

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	750.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information

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EDUCATIONAL ACTIVITIES (purchase of study books and material, including computers, funding for participation in courses, summer schools, workshops and conferences): financial aid per PhD student.

TEACHING ASSISTANTSHIP: availability of funding in recognition of supporting teaching activities by the PhD student.
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 AVAILABILITY:
1st year: Yes
2nd year: Yes
3rd year: Yes


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