



# PhD in SCIENZE E TECNOLOGIE ENERGETICHE E NUCLEARI / ENERGY AND NUCLEAR SCIENCE AND TECHNOLOGY - 39th cycle

**PNRR 118 PNRR Research Field: DESIGN OF TWO-PHASE EXPANDERS FOR HEAT PUMP AND REFRIGERATION CYCLES**

Monthly net income of PhDscholarship (max 36 months)
<b>€ 1400.0</b>
In case of a change of the welfare rates during the three-year period, the amount could be modified.

Context of the research activity	
<b>Motivation and objectives of the research in this field</b>	The application of turbo-expanders in inverse cycles - as substitute of the expansion valves - allows for a consistent increase of the COP. To get such results improvements in the state of the art design methodologies and thermodynamic modelling are required. In the project a turbine will also be manufactured and tested
<b>Methods and techniques that will be developed and used to carry out the research</b>	During the design, the phd will make use of in-house developed meanline tools, high fidelity CFD coupled to shape optimisation and thermodynamic tools. Tests will be carried out on a rig available at Politecnico-energy dept.
<b>Educational objectives</b>	To provide a cutting-edge know-how in two phase turbine design able to recovery with high efficiency the energy presently dissipated in the expansion valve.
<b>Job opportunities</b>	Applied research in turbomachinery design and optimization within industry or university. There is a wide number of international and national industrial collaborations with a strong request of high profile specialist in turbomachinery design, modelling and testing.



<b>Composition of the research group</b>	2 Full Professors 2 Associated Professors 1 Assistant Professors 3 PhD Students
<b>Name of the research directors</b>	paolo.gaetani

<b>Contacts</b>
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<b>Additional support - Financial aid per PhD student per year (gross amount)</b>	
<b>Housing - Foreign Students</b>	--
<b>Housing - Out-of-town residents (more than 80Km out of Milano)</b>	--

<b>Scholarship Increase for a period abroad</b>	
<b>Amount monthly</b>	700.0 €
<b>By number of months</b>	6

<b>National Operational Program for Research and Innovation</b>	
<b>Company where the candidate will attend the stage (name and brief description)</b>	
<b>By number of months at the company</b>	0
<b>Institution or company where the candidate will spend the period abroad (name and brief description)</b>	
<b>By number of months abroad</b>	6

<b>Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information</b>
<p>Educational activities:</p> <p>Financial aid per PhD student is available for purchase of study books and material, funding for participation in courses, summer schools, workshops and conferences, instrumentations and computer, etc. This amount is equal to 10% of the annual gross amount, for 3 years.</p> <p>Teaching assistantship:</p> <p>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.</p>



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Computer availability: individual use.

Desk availability: individual use