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We are looking for a master student to work on

# Design of Electrical Machines for Maritime Propulsion Systems

## Background

In the last years, electric propulsion systems are gaining attention in the maritime propulsion sector, both as full-electric propulsion and as a part of a hybrid propulsion system, thanks also to their superior efficiency and the higher flexibility offered in the onboard space management. The design of the propulsion eMotors is a challenging task, because of the high power and torque required from the application and the weight and volume limitations, related also to the vessel design. The high torque of the application and the limited voltage onboard allows the consideration to several solutions for electric motor design, different from the standard induction motors or synchronous generators, as anisotropic PM motors, multiphase windings, special cooling system and so on.

Currently, PEIC is cooperating with Fincantieri on the definition of guidelines for the preliminary design of eMotor ([LinkedIn post](#)). This research will be useful for Fincantieri to study the effect of different propulsion eMotor solutions at the very early stages of the vessel design.

## Thesis goal

The goal of the thesis is to test the preliminary design procedures developed from PEIC and included in SyR-e ([https://github.com/SyR-e/syre\\_public](https://github.com/SyR-e/syre_public)) on a maritime propulsion benchmark. First, a critical analysis on the design specifications will be conducted, guiding the selection of the design inputs. Then, the preliminary electro-magnetic design will be conducted, with emphasis on the key performance index required by the maritime application.

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## Your tasks

- Critical analysis of the design specifications of electric motors;
- Electromagnetic and thermal preliminary design of an eMotor for naval propulsion
- Comparison of different design solutions, identified during the preliminary analysis.

## Necessary skills

- Knowledge of electrical machines and electrical drives;
- Basic knowledge of Matlab;
- Problem-solving and team-working skills;

## What you will learn

- To analyze state-of-the-art technical literature;
- The basic principles of electrical machines design;
- Finite Element Analysis (FEA) pre- and post-processing and problem conditioning;
- Advanced knowledge of Matlab programming.

**Duration of the thesis:** 6 months

**Application:** We are looking forward to receiving your application. Please include your CV and a short explanation why you fit the position (Italian or English). Send your application to [simone.ferrari@polito.it](mailto:simone.ferrari@polito.it) and [gianmario.pellegrino@polito.it](mailto:gianmario.pellegrino@polito.it).