

Experimental and numerical study of pump characteristics evolution under two-phase flow conditions

The main objectives concern hydraulic pump performance modifications with incoming two-phase flow conditions. Both experimental and numerical approaches will be conducted.

A specific test stand is already available in Arts et Métiers ParisTech in Lille.

Variable volume gas-liquid ratio can be achieved .

Numerical 3D viscous approach will also be conducted for various inlet conditions.

Experiments and calculations results will be analysed and compared in order to get a better analysed of the flow behaviour.

If possible, a one dimensional model will be also set up for industrial end users, in order to have a better and rapid prediction of the whole pump with these particular two- phase flow conditions.

GENERAL TOPIC: Fluid Mechanics - Turbo-machinery – Pumps

The PhD Thesis will take place in the Research Team of the Laboratoire de Mécanique de Lille which deals with « turbulent and rotating flows ». This team is working on the experimental and numerical characterisation of turbulence, and especially of wall turbulence. It has, for a few years, developed research in the field of flow control in a boundary layer in an adverse pressure gradient.

On the other hand, this team is also working on turbomachinery, with a strong experimental activity in the field of rotor-stator interaction in radial flow pumps.

Finally, the team is also one of the European leaders for the development of Particle Image Velocimetry. A great amount of metrological facilities are available in the optical metrological platform Meol (www.meol.cnrs.fr).

Candidate profile

The candidate should hold a Master of Science or equivalent diploma in Fluid Mechanics.

Motivation for experimental work is necessary.

Good skills in programming (C, C++, fortran) would be advantageous.

Language : English.

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Application:

Please send application form and materials to Mr. Yvon VELOT

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