

## **An Experimental Setup for Thermal Jets Dispersion Analysis**

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### **Abstract**

Thermal powerplants for energy production often pump water from a colder source (e.g. river or lake) into their refrigeration circuit to later release it in a form of a jet or plume into the aquatic environment. Since the released water is at a higher temperature than the surrounding environment, it will contribute to its warming, thus potentially causing environmental damage like the increase of algae and eutrophication. This paper presents an experimental setup designed to model the dispersion of jets and plumes, capable of measuring both the velocities and temperatures of the jet and ambient. This experimental setup integrates a temperature-controlled tank, a water reservoir, a pump and a flowmeter. The water pumped from the temperaturecontrolled tank into the reservoir by means of a nozzle placed at the bottom. This nozzle can be easily changed and adapted to different geometry and configurations. A laser is used to light the reservoir and the jet section. Imaging acquisition techniques are then used to capture the jet trajectory, and its velocity can be determined by means of Particle Image Velocimetry. Finally, the simplicity of the proposed setup allows it to be easily up-scaled.