

The Curious Cryogenic Fish (CCF): Development of a diagnostic robot for large cryostats

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The Curious Cryogenic Fish (CCF) is a robotic device that may in future operate in large cryostats used for particle physics experiments, such as DUNE. The goal is to perform visual inspections, diagnostic measurements and simple manipulative tasks, integrating the functionalities of a diagnostic station with the flexibility of an unmanned vehicle-manipulator.

Such a device would allow to inspect the complete inner volume of the cryostat, contrary to the fixed cameras systems used today.

The main focus of the paper is on the many technical challenges to be faced: energy management for unwired motion in cryogenic environments, a propulsion system that minimizes perturbation to the medium and avoids any contamination, localization and motion control relying on wireless data transmission between the inner part of the cryostat and the outside, etc. The combination of these points into a single robotic device has never been done before. First design concepts will be illustrated.

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