

## **Design and development of Electronics modules for a Compact Cold Atom Inertial System**

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### **Abstract**

Research aim is to develop a compact electronics module for a cold atom interferometer based system using Rubidium atoms (780nm). Laser systems are one of the most critical part of the cold atom system as they have to be stable in terms of optical power, frequency, line width and spectral properties and should also be a compact system. It is also required to control modulator drivers, RF drivers and detection systems by suitably pulsing the devices as per the requirement of the measurement system. In laboratory-based set ups, these devices are accommodated in multiple electronics racks and transportation of the systems will be a bit difficult. Hence, it is proposed to develop autonomous laser modules, its sub-systems and associated control systems to generate all the required beams with necessary frequency shifting and independent controls to modify, in a compact way. Present plan is to realize a Field Programmable Gate Array (FPGA) based system enabling the requirements like lock-in amplifier, Proportional Integral Differential (PID) controller, pulse sequencing, etc., required for the cold atom interferometry.