

Project Title: Experimental Atomic Physics with Homebuilt Laser Systems

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Description: My group has developed a new class of low cost, homebuilt, vacuum-sealed, auto-locking laser systems that can be frequency stabilized with respect to atomic, molecular, and temperature tunable solid state frequency markers without human intervention. Summer research projects will focus on the applications of these laser systems in several exciting experiments that include:

- 1) Ultra cold atom sensors that measure gravitational acceleration with high precision
- 2) Time domain magnetometers that can realize the most sensitive measurements of diffusion coefficients required to understand the performance of these devices
- 3) Coherent transient experiments that are capable of realizing the most precise measurements of atomic lifetimes
- 4) Free space optical tweezers that trap dielectric particles, and rapidly determine their masses by investigating kinematics on fast time scales

The intense record of student involvement in my group is described on my group web page (<http://datamac.phys.yorku.ca>). Interested applicants should contact Professor A. Kumarakrishnan (Kumar) at akumar@yorku.ca. I will do my best to interview students so that complete applications can be submitted to the physics office by the deadline (Friday, February 26).