Control and Precision Measurement via CMU Cold-atom Facility

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Over the past 20 years, constant endeavor to control atom-light interactions has established newly emerging technologies, i.e. ultra-high precision and ultra-fast measurements. Since Quantum Mechanics is basically a theory at absolute zero, neutral atoms laser-cooled to sub-microkelvin have naturally been playing a major role in breaking the classical barriers of measurement towards the quantum limits which are fundamental to nature. In the global scale, atomic deceleration has found its way to boost up research activities in various scientific disciplines, e.g. quantum information and quantum computing which are at the heart of our current research. Correspondingly, innovative multidisciplinary collaborations with cold-atom research in Chiang Mai University are now opening a new chapter in developing precision quantum devices for applications in molecular biochemistry, health science, oil and gas explorations, optical communication, and military defense.

For this visit, the original concept that has led to thirteen newly established laboratories residing adjacent to each other in the Central Science Lab, Faculty of Science, will be presented. Also described in detail is the anticipation that cold atoms, precision measurements and controls at atomic scale may bring about to novel research topics and breakthroughs. At the end, an establishment of research collaboration via technology transfer and know-how is awaiting.

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