

Development of quantum technologies using cold atoms

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Abstract:

The development of advanced technologies exploiting fundamentals of quantum physics is nowadays a frontier activity in the technology innovations across the world. In this context, the development of cold atoms based quantum sensors is in progress at RRCAT. In this presentation, the development of a cold atom gravimeter (CAG) at RRCAT for precision measurement of earth's gravitational acceleration will be discussed. A gravimeter such as this has applications in exploration of mineral and oil-fields, in geodesy and geophysics, in detection of underground structures, and in monitoring seismic activity. In addition to the gravimeter, the development of other sensors, such as cold atoms based ultra-high vacuum (UHV) sensor and cold atoms based micro-wave field sensor will also be presented. Along with the development of cold atoms based quantum sensors, it is also planned to expand the activity to optically trap atoms for their use as quantum qubits. The recent progress in this direction will also be covered in the presentation.