

Towards scalable quantum computer using Yb atoms– DST



Dr. Kanhaiya Pandey (PI)/Department of Physics

Dr. Tapan Mishra (Co-PI) /Department of Physics

Theme: Laser cooling and trapping of Yb atom at 399nm and at 556 nm transition; Loading the Yb atoms in optical dipole trap ; Evaporating cooling of Yb atoms upto quantum degeneracy; Loading the Yb atoms in the optical lattice; Addressing the Yb atoms using 1S0 to 3P2 transition ; Loading and addressing the Yb atoms in Optical tweezer array for quantum computation

Objective:

- Design and testing of Yb atomic source under high vacuum condition
- Zeeman slowing and initial cooling of Yb atoms up to temperature mK using 399nm (Blue MOT)

Deliverables: Magneto-optical trap of Yb atoms at 399nm transition

❖ Outcome through Project:

- Cold Yb atom at few mK temperature

❖ Societal Impact:

- Very high as the cold atom is promising platform for the quantum technologies.

• Current Status:

- We are currently designing the experimental setup and procuring the equipment. Below is our designed vacuum system.

