KAAPI WITH KURIOSITY

Novel phases of matter near absolute zero temperature

In this talk, I will describe how atoms are cooled down to temperatures near absolute zero to realise a Bose-Einstein Condensate (BEC), the coldest matter in the universe, also known as the 'fifth state of matter'. At such low temperatures, a billion times colder than the interstellar space, atoms behave like waves and their intriguing quantum nature is manifested giving access to novel and exotic phases of matter such as supersolids which can simultaneously exist in crystalline form like solids and flow without friction like superfluids. Ultra-cold atoms in optical traps are highly controllable systems which offer a versatile platform for Quantum Technology applications such as quantum computation and quantum sensing. Cold atoms can be used to realise the most precise gravimeters in space as well as accurate atomic clocks for Satellite Navigation and Global Positioning Systems (GPS).

Sanjukta Roy

Dr Sanjukta Roy is a DST Scientist at Raman Research Institute, Bangalore. Her research is focused on Quantum Simulation with ultra-cold atoms and Bose-Einstein condensates in optical lattices, Quantum technologies with ultra-cold Rydberg atoms and few-body physics. She obtained her PhD from Tata Institute of Fundamental Research, Mumbai during which she realised the first Bose-Einstein condensate (BEC) in India. She did her Post-doctoral research at Laboratoire Kastler Brossel, Ecole Normale Superieure, Paris and European Laboratory for Non-Linear Spectroscopy (LENS), Florence, Italy. She has won several awards and honours including DST award for attending Lindau Nobel Laureates meeting, Letter of appreciation from the Prime minister of India and Outstanding Reviewer awards (2016 and 2019) from IOP Publishing, UK.

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