

# Nasa lab creates a new state of matter

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**Mumbai:** Nasa's Cold Atom Laboratory (CAL) mission has succeeded in producing a state of matter known as a Bose-Einstein condensate, a key breakthrough for the instrument leading up to its debut on the International Space Station in late 2016.

The project manager is Indian-American Anita Sengupta who played a key role in the entry, descent and landing of Curiosity on Mars in August 2012. According to Nasa, a Bose-Einstein condensate (BEC) is a collection of atoms in a dilute gas that have been lowered to extremely cold temperatures and all occupy the same quantum state, in

which all of the atoms have the same energy levels.

At a critical temperature, atoms begin to coalesce, overlap and become synchronized like dancers in a chorus line. The resulting condensate is a new state of matter that behaves like a giant — by atomic standards — wave. "It's official. CAL's ground testbed is the coolest spot at Nasa's Jet Propulsion Laboratory at 200 nano-Kelvin (200 billionths of 1 Kelvin)," CAL Project Scientist Rob Thompson at JPL in Pasadena, California, said.

"Achieving Bose-Einstein condensation in our prototype hardware is a crucial step for the mission."

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