Diamagnetic levitation of liquid drops and bubbles

Richard Hill

Department of Physics, University of Nottingham

It is now quite well-known that a spatially varying magnetic field can levitate diamagnetic material, such as a droplet of water. Diamagnetic levitation provides us with a method to simulate a 'zero-gravity' environment within a laboratory setting, allowing us to study freely suspended droplets without the constraints and costs of space flights or parabolic flights.

I will focus on our research using 16-18 tesla superconducting magnets to investigate how the equilibrium shape of a free liquid droplet changes under the influence of increasing spin and charge. I will also show how the position of individual levitated droplets can be manipulated in the magnetic field.

Less well-known is the capability to also 'levitate' bubbles of gas in a liquid using a variation on the principle: I will show how the technique can be applied to study the vibrations of isolated gas bubbles which are effectively neutrally buoyant in the liquid.