OBSERVATION OF VORTICES IN SUPERFLUID He DROPLETS

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A continuous beam of superfluid He droplets has been used to assemble Ag clusters consisting of up to 10^6 atoms. The obtained clusters have been characterized by imaging after being surface-deposited via the droplet beam. The average sizes of the deposited clusters are in good agreement with an estimate based on the energy conservation of Ag cluster growth in He droplets. Whereas the deposited clusters obtained in droplets of less than 100 nm in diameter are round, those obtained in droplets larger than about 300 nm are elongated and track-shaped. The prevalence of the tracks shows that quantum vortices are present in such large droplets and that their lifetime exceeds a few milliseconds. We also discuss the possible formation mechanisms and the stability of the vortices.