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Room 313, Ed. Ricci-Curbastro
Dept. of Physics and Astronomy

Dr. Noemi Torriero

Dept. of Physics and Astronomy, University of Padova, IT

Droplet microfluidics for isolation of extracellular vesicles

Extracellular vesicles (EVs) are nanosized particles released by all cell types in both physiological and pathological conditions, whose role as mediators of intercellular communication is now well known. Recent studies have also recognized EVs as potential biomarkers for cancer, infectious and neurodegenerative diseases, leading to the necessity to investigate newer and innovative methods for precise EV isolation. Among the current protocols, ultracentrifugation, ultrafiltration and immunocapture are the most commonly used, each of them presenting strengths and limitations. In this context, droplet microfluidics, i.e. the generation and manipulation of sub-microlitre droplets, emerges as a powerful tool for EV isolation, especially when combined with the specific magnetic beads-mediated immunocapture. In this seminar, several applications of droplet microfluidics will be explored, including EV isolation from human plasma. The comparison with the most conventional EV isolation methodologies clearly demonstrates the advantages and the huge potentialities of droplet microfluidics, paving the way for its future use in the biomedical research.