

Bubbles, Drops and Vesicles: The Charm of Microfluidics

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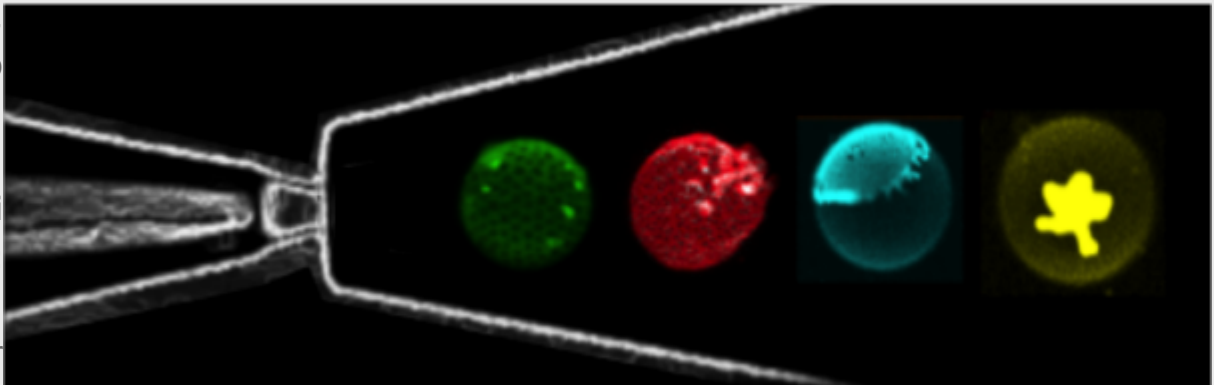
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When: Friday, February 02, (2018), 12:00.

Place: Department of Theoretical Condensed Matter Physics, Faculty of Science, Module 5, Seminar Room (5th Floor).

Speaker: Laura R. Arriaga, Universidad Complutense de Madrid, Spain.

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he exquisite control over the flow of fluids afforded by microfluidic technologies enables the design of materials with precise properties. In this talk, I will show some examples. For example, flowing air into a liquid enables the production of foams made bubble-by-bubble; these can be solidified, resulting in controlled porous architectures [1]. Moreover, flowing a liquid into a second immiscible liquid enables the production of emulsions consisting of drops; their surface can be used as a one-pot system for synthesis, assembly and display of functional membrane proteins [2]. Furthermore, the incorporation of additional fluids enables the generation of controlled multiple emulsions; these afford many more possibilities for creating new materials. Among them, water-in-perfluorocarbon-in-water double emulsion droplets can be used for acoustic-triggered release of payloads [3]. In addition, water-in-oil-in-water double emulsion droplets with very thin shells can be used as templates for vesicle formation [4]. These vesicles are monodisperse in size, have uniform composition and a high encapsulation efficiency as the flow stream of the fluid that forms the vesicle core is completely separated from the outer fluid [5] these overcomes the limitations of vesicles produced by conventional methods. Despite bubbles and drops are all produced by microfluidics one at a time, I will also show that scaling up is possible [6].

References

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