

## Séminaire Jeudis de l'IES

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Mardi 20 juin 2017 - 14h salle Jean-Pierre Nougier

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**Numerical modeling of the threshold behavior  
of mesoscale lasers**

In the past three decades technology has done gigantic progress in the miniaturization of lasers, with the explicit goal of obtaining devices which the smallest possible (subwavelength) footprint, ultralow power consumption and extremely reduced thermal budget. While the technological aspects have been crowned by considerable success, modeling -- together with a good experimental characterization of small-sized lasers -- has remained a challenge which is finally being met, by quantum theories, at the smallest scales. The intermediate scales, defined as cavity volumes capable of supporting 10 to 10000 electromagnetic modes, has met all along with contradictions and interpretative difficulties. A recent approach, based on a fully stochastic model, has allowed us to provide an excellent match to experimental observations, while agreeing with the macroscopic features well-described by semiclassical equations. Different aspects related to this new approach will be discussed, highlighting experimentally verified numerical predictions and shining new insight into the transition of the laser from incoherent to coherent emission.