Bertrand Toën: Infinitesimal aspects of derived algebraic geometry

This series of lectures is an introduction to derived algebraic geometry with a particular focus on infinitesimal aspects (differential calculus, etc.). The first lecture will present the general language of derived algebraic geometry: derived schemes and stacks, derived categories, cotangent complexes, derived mapping stacks and representability. It will also include a very short review of basic infinity-category theory (which will be used all along the lectures). The second lecture will be devoted to the de Rham theory of derived algebraic stacks and its relations to formal completions and formal derived stacks: derived de Rham complex, Hodge filtration, relation with Betti cohomology and with derived loop spaces. Finally, the in the last lecture I will introduce shifted symplectic and shifted Poisson structures on general derived algebraic (*n*-)stacks. I will explain how the materials of the two previous lectures can be used in order to prove the existence of canonical deformation quantizations of shifted Poisson structures. This last lecture includes a glimpse of the theory of infinity-operads and their geometrico-algebraic models, formality theorems as well as open problems.