



Tuesday, May 16th, 2017 – 10:00 a.m.
CFEL Seminar room IV (Bldg. 99)

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Open quantum systems: a geometric description

In this talk, I will present some of the results in my PhD dissertation, whose main topic is the geometric description of open quantum systems. Differential geometry allows for an intrinsic formulation of mathematical models, thus achieving a better characterisation of their properties. I will analyse from a geometric perspective the manifold of pure and mixed states of quantum systems and its properties, such as its stratification in terms of the rank of states [1]. The algebraic properties of observables allow to define a Poisson and a symmetric tensor fields on the manifold, which are necessary in order to describe features such as dissipation and Markovian dynamics in an intrinsic way. Applications to Molecular Dynamics, in particular the Hamiltonian description of the Ehrenfest model, will also be discussed [2,3].

[1] Grabowski, Kus, Marmo. Symmetries, group actions and entanglement. *Open Syst. Inf. Dyn.* 13, 343–362 (2006)

[2] Alonso et al. Statistics and Nosé formalism for Ehrenfest dynamics. *J. Phys. A Math. Theor.* 44 395004 (2011)

[3] Alonso et al. Ehrenfest dynamics is purity non-preserving: a necessary ingredient for decoherence. *J. Chem. Phys.* 137 54106 (2012)

Host: Angel Rubio

