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**MANUELE SANTOPRETE**, Wilfrid Laurier University

*Canonoid and Poissonoid Transformations, Symmetries and bi-Hamiltonian structures.*

Symplectic transformations between symplectic manifold are maps that preserve the symplectic structure. Such maps transform any Hamiltonian system on the first symplectic manifold to a Hamiltonian system on the second symplectic manifold. Canonoid transformations are a generalization of symplectic transformation. They transform a given Hamiltonian system defined on a symplectic manifold to another Hamiltonian system. The term “canonoid” was introduced by Saletan and Cromer in 1971. A modern coordinate-free definition was given by Marmo in 1976. In this talk we will give an introduction to canonoid transformations. Then we will generalize such transformations to the Poisson case, introducing “Poissonoid transformations”. We will give a brief introduction to bi-Hamiltonian systems, an important type of integrable systems. We will show that Poissonoid transformations may be useful to obtain bi-Hamiltonian structures in certain examples (e.g. the rigid body, the multidimensional rigid body, and Kirchhoff's equations for a rigid body in a fluid).