河南大学110周年校庆系列学术活动

河南大学数学与统计学院

河南大学数学研究中心

课程题目： ***Geometry and Dynamics of Singular Symplectic Manifolds***

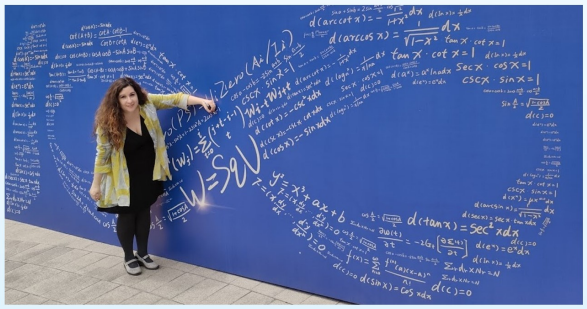
主 讲 人：Prof. Dr. Eva Miranda

单　　位： Universitat Politècnica de Catalunya and Paris Sciences et Lettres

时　　间： 9月7日-9月30日 每周二、四19点

ZOOM ID： 815 7127 3363

密　　码： 123456



个人简介： Eva Miranda is a Full professor at UPC-IMTech, member of CRM and chercheur afflilié at Observatoire de Paris. She is director of the Lab of Geometry and Dynamical Systems. Since 2018 she is member of the Governing Board of BGSMath and since 2020 she is member of the Board of Trustees at Institut Henri Poincaré (Paris).Her research is at the crossroads of Differential Geometry, Mathematical Physics and Dynamical Systems. She works with objects appearing on the interface of Geometry and Physics such as integrable systems and group actions acquainting for symmetries of the systems. She is particularly interested in building bridges between different areas such as Geometry, Dynamical Systems, Mathematical Physics and, more recently, Fluid Dynamics. She has published over 50 articles including Ann. Sci. Éc. Norm. Supér. (4), Adv. Math., PNAS, J. Math. Pures Appl. (9), and Comm. Math. Phys. She has supervised a total of 6 Ph.D. theses and is currently supervising 3 more. Eva Miranda has been awarded the ICREA Academia Prize in 2016. In 2017 she was awarded a Chaire d'Excellence of the Fondation Sciences Mathématiques de Paris. Miranda has been plenary speaker in the top workshops in her field and invited speaker at the 8th European Congress of Mathematicians.

课程安排： We will describe a novel geometrical approach to classical problems in Celestial Mechanics concerning collisions. The upshot of our methods is that the singularities (collisions, infinity line) are included in the geometrical techniques(as b-symplectic manifolds, b-contact manifolds). We will focus on the geometry and Dynamics of these manifolds and describe several techniques such as desingularization, normal forms, action-angle coordinates and perturbation theory used in this study.Planning with description of contents per day. Each session will start at 1pm Barcelona time (19:00 Beijing time) and last for 1.5 hour.

September 7 19:00-20:30 Overture	Introduction to the course. Basic definitions in Symplectic Geometry and motivation for b-symplectic geometry. B-symplectic manifolds as Poisson manifolds.
September 9 19:00-20:30	Melrose language of b-forms. b-symplectic forms on b-Poisson manifolds. The geometry of the critical set. More degenerate forms b^m-symplectic forms and b^m contact forms. Desingularization of b^m-forms.
September 14 19:00-20:30	The path method for b^m-symplectic structures. Local normal form (b^m-Darboux theorem) and extension theorems. b^m-Structures to the test: Examples in Fluid Dynamics and Celestial Mechanics. The b-symplectic and b-contact geometry of the restricted three body problem and of Beltrami fields. Application: Finding periodic orbits for trajectories of a satellite in the restricted three body problem.
September 16 19:00-20:30	Exercise session
September 21 19:00-20:30	Some classical problems for b^m-symplectic and b^m-contact manifolds: The (singular) Weinstein conjecture. Connection to escape orbits in Celestial Mechanics.
September 23 19:00-20:30	More symmetries: Toric actions, action-angle coordinates and Integrable systems on b^m-symplectic manifolds. Applications: ons Perturbations of integrable systems and KAM theory.
September 28 19:00-20:30	Exercise session
September 30 19:00-20:30	Finale: Open problems including Arnold conjecture and Floer homology of Singular Symplectic Manifolds.

欢迎感兴趣的老师和学生参加！