

Symplectic topology (Prof. Michael Entov)

Symplectic topology is a field of mathematics that provides a proper geometric framework to describe classical mechanical systems and their evolution with time (for instance, the motion of celestial bodies: planets, satellites etc.). In geometric terms the state of a mechanical system at each moment of time is described by a point in a high-dimensional space and the evolution of the system is described by the movement of the point along an integral trajectory of a vector field. Symplectic topology brings together a huge variety of methods and structures from geometry, topology, algebra, analysis, dynamics and partial differential equations in order to analyze the existence and behavior of the integral trajectories of certain special kinds (for instance, closed trajectories, or trajectories connecting two given sets). This is also the general theme of my current research.

Symplectic topology is a really beautiful field because it involves deep connections between many different mathematical areas and in this way demonstrates the unity of mathematics. On the other hand, this is also the reason why getting started in symplectic topology requires a rather extensive background -- in particular, in geometry and topology.