Contact geometry and applications to high energy physics

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Contact manifold is a manifold equipped with codimension one distribution which is maximally nonintegrable. The last condition implies that contact manifolds are always odd-dimensional. In the literature they are regarded as odd-dimensional generalizations of symplectic manifolds. During the lectures we shall examine the traditional definition of a contact manifold and explore the alternative approach via homogeneous symplectic structures. Using the symplectic approach we shall discuss contact Hamiltonian dynamics as well as a version of contact Lagrangian mechanics, Hamilton Jacobi theory and contact reductions. We shall learn by closely examining several examples. Each lecture will be accompanied by a few homework problems for willing participants.