Séminaire de matrices, cordes et géométries aléatoires

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Mercredi 12/06/2019, 14h15-15h15

Orme des Merisiers Salle Claude Itzykson, Bât. 774

From generalized global symmetries to pulsar magnetospheres

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Pulsars are thought to be surrounded by strong magnetic fields as well as a high density of charged particles; the resulting zero temperature system is highly nonlinear. In this talk I will discuss an effective theory approach to describing this medium. A key role is played by generalized global symmetries: just as ordinary global symmetries enforce the conservation of particle number, some quantum field theories possess generalized global symmetries, which enforce the conservation of extended objects such as strings (or magnetic field lines). I will review this symmetry principle and explain how it allows a systematic construction of an effective theory describing a strongly magnetized plasma; at leading order in derivatives this effective theory agrees with the standard treatment. The inclusion of higher derivative terms however generically results in new and potentially observationally relevant effects, such as electric fields that accelerate charges along magnetic field lines.