Mini-Course

Topics in Mathematical General Relativity

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Abstract

Einstein's theory of general relativity is a well-established theory of gravity. One of the basic problems in the mathematical theory of general relativity is to understand the singularities in the maximal Cauchy developments satisfying the Einstein's equations. In this mini-course, we will study this problem with a focus on the case where the initial data are spherically symmetric. In this case, the analysis becomes simpler and more results are available. The goal of the mini-course is to understand the motivations and formulations of the weak and strong cosmic censorship conjectures for the Einstein--Maxwell--scalar field system (in spherical symmetry) and some elements of their proofs. Topics include Birkhoff's theorem, Penrose's inequality, Penrose's incompleteness theorem, stability of Minkowski spacetime, introduction to the weak and strong cosmic censorship conjectures. Some background in basic differential geometry will be useful but no background in PDEs will be assumed.

Date & Time :   *July 15, 2016 (Friday)   10:00am - 12:00noon*
                   July 18, 2016 (Monday) 2:00pm - 4:00pm
                   July 19, 2016 (Tuesday) 2:00pm - 4:00pm

Venue :   *Room 222, Lady Shaw Building*
                   The Chinese University of Hong Kong

All are Welcome