

Graduate Student Seminar

Speaker:

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*Thursday, October 1, 2015
1:00-2:00pm in HH-3017*

Geometric inequalities for initial data with symmetries

Abstract:

An interesting open problem in general relativity is to investigate extensions of mass-angular momentum inequality to higher dimensions. We consider a class of initial data sets (Σ, h, K) for the Einstein constraint equations which we define to be generalized Brill (GB) data. This class of data is simply connected, $U(1)^2$ -invariant, maximal, and four-dimensional with two asymptotic ends. We study the properties of GB data and in particular the possible topology of Σ . Moreover, we construct a 'mass functional' for this initial data which agrees with the ADM mass of ' $t - \phi^i$ ' symmetric vacuum initial data. Then we show that this functional has the same critical points as Carter's positive definite action for the stationary vacuum Einstein equations with the above spatial isometry group. Finally, we use this mass functional and prove the following geometric inequalities: 1) positive mass theorem for GB data, 2) local mass-angular momenta inequality for $U(1)^2$ invariant black holes, 3) global mass-angular momenta for $U(1)^2$ invariant black holes with horizon topology S^3 .

Note: The talk by Danny Dyer will be re-schedule.