Department of Mathematics
University of Notre Dame

GEOMETRIC ANALYSIS SEMINAR

Speaker: Philippe LeFloch
Laboratoire J-L Lions and CNRS

Date: Thursday, March 31, 2022

Time: 11:00 AM

Location: Zoom

Zoom URL: notredame.zoom.us/j/96288130964?pwd=c2dDelJJTXhSdTBVSEtLYlI1NEdzZz09

Lecture Title:

Recent advances on self-gravitating massive fields: nonlinear stability, asymptotic decay, and singularities

Abstract

I will present recent mathematical developments on self-gravitating massive fields. In collaboration with Yue Ma, I established the global nonlinear stability of self-gravitating Klein-Gordon fields in the regime near Minkowski spacetime, when the metric enjoys only low decay conditions at spacelike infinity. Our strategy of proof, referred to as the Euclidean-Hyperboloidal Foliation Method, applies more generally to nonlinear wave-Klein-Gordon systems. On the other hand, the Seed-to-Solution Method, which I recently introduced in collaboration with T.-C. Nguyen, generates classes of asymptotically Euclidean manifolds satisfying Einstein's constraint equations under prescribed asymptotic conditions at infinity. Motivated by Carlotto and Schoen's optimal localization problem, we formulated and solved an asymptotic localization problem. Einstein's constraint equations also play a central role in understanding spacetimes in the vicinity of singularity hypersurfaces, and a recent work in collaboration with B. Le Floch and G. Veneziano provides a large class of bouncing cosmological spacetimes. Blog: philippelefloch.org

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