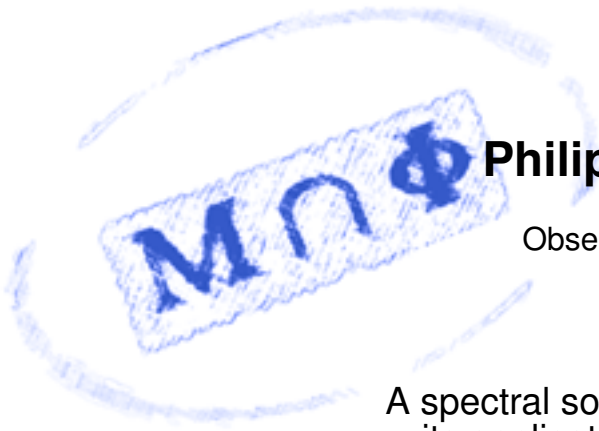


Séminaire de mathématique physique



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A spectral solver for theoretical physics and
its application to black hole spacetimes

Résumé : Spectral methods are a class of techniques that aim at solving partial differential equations by expanding the various fields on appropriate functions known as the basis functions. The main advantage is then a very fast convergence of the numerical solution to the real one. Nevertheless, it must be stressed that designing a spectral solver can be a challenging task, especially for complicated geometries.

After having explained the mathematical foundations of spectral methods, I will present an effort to build a tool that enables the use of spectral methods for a wide class of problems: the Kadath library. It has been designed to be very modular, in terms of the geometry and the type of equations it can deal with. The user interface has been made as friendly as possible.

The Kadath library has been used to compute various solutions of physical interest and I will illustrate its capabilities by showing some results for spacetimes containing single or binary black holes, in the context of general relativity.

Jeudi 22 avril à 16 :15 — salle A318, 3ème étage