On the asymptotic behaviour of Bianchi spacetimes

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Abstract

A Bianchi spacetime is a spatially homogeneous globally hyperbolic spacetime. One the one hand, the asymptotic behaviour of the most rigid Bianchi spacetimes (Bianchi I and II spacetimes) is very simple and well understood. On the other hand, it has been conjectured for a long time that the aysmptotic behaviour of generic Bianchi spacetimes (Bianchi VIII and IX spacetimes) close to their initial singularity is "oscillatory and chaotic". I will present several recent results by myself and other authors which show that this is indeed the case :

- many vacuum Bianchi VIII and IX spacetimes have a "very complicated" oscillatory behaviour close to their initial singularity,
- the slightest change in the initial Cauchy data of such a spacetime leads to a dramatic change of its asymptotic behaviour.

I will also try to explain why these results imply that many Bianchi spacetimes are *asymptotically silent*, contradicting a conjecture of Misner.