

# How GENERIC arises from upscaling a Hamiltonian system

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**16:00-17:00h on campus in M.G.004**  
**Analysis & Geometry Seminar, Antwerpen**

In this talk, on joint work with Alexander Mielke and Johannes Zimmer, I want to explain our recent insights in how irreversibility arises out of coarse-graining reversible systems. In this context, 'irreversibility' means a system in GENERIC form, and 'reversible system' is a Hamiltonian system. The big question is how and why entropy and the Onsager operator appear.

The mathematical version of this question consists of taking a Hamiltonian system, doing some 'coarse-graining' and then proving that, miraculously, the irreversible parts of GENERIC appear. We study a particular example, in which many calculations can be done by hand, and in which one can trace the origins of entropy and the Onsager operator back to the Hamiltonian system.