CMUP

Centro de **Matemática**
Universidade do Porto

Geometry, Topology and Dynamical Systems

Joint Seminar

Date. December 14, **15h30**

Place. Room M031

Speaker. Alexey Glutsyuk[1] (ENS-Lyon)

Title. On periodic orbits in complex planar billiards

Abstract. A conjecture of Victor Ivrii (1980) says that in every billiard with smooth boundary the set of periodic orbits has measure zero. This conjecture is closely related to a conjecture of Hermann Weyl (1911) from the spectral theory. The particular case of Ivrii's conjecture for triangular orbits was proved in dimension two by M.Rychlik (1989), several other mathematicians, and in arbitrary dimension by Ya.Vorobets (1994). The case of quadrilateral orbits in planar billiards has been recently treated in our joint paper with Yu.Kudryashov. A new approach to Ivrii's conjecture is to study complex billiards. We will discuss the complexified version of Ivrii's conjecture for reflections with respect to complex planar analytic curves. It appears that thus complexified Ivrii's conjecture is false, and it would be interesting to classify the counterexamples. We will show that the only "nontrivial" counterexamples with four reflections are formed by couples of confocal conics. This result has an application to an analogue of the real Ivrii's conjecture: the invisibility problem. If the time allows, we will discuss a small result concerning impair number of reflections.

Remark. Coffee with the speaker is served after the talk (16h30 - 17h00)

[1]Alexey Glutsyuk is a CNRS researcher at École Normale Supérieure de Lyon, France. He obtained his Ph.D. degree in Mathematics at Moscow State University (Russia) under the supervision of Y. S. Ilyashenko, in 1996. His main research interests are dynamical systems, group actions by diffeomorphisms, foliations by Riemann surfaces and uniformization. More information at http://www.mccme.ru/lifr/pers/glutsuk.htm