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Poisson cohomology and Deformations

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Scientific Report

The present scientific report concerns a three week research visit in the Université Catholique de Louvain, in Belgium, that was sponsored by the ESF.

I am a PhD student at the University of Poitiers, working on Poisson cohomology and deformations, under the supervision of Prof. Pol Vanhaecke. My first project was to determine the Poisson cohomology (and homology) of two important classes of Poisson algebras, in two and three dimensions. A weight homogeneous polynomial yields indeed a Poisson structure on $\mathbf{F}^3$ and on the singular surface, which is given by its zeros. On the latter, the Poisson structure is symplectic everywhere except on the singularity. The results have been announced in an article published in Comptes Rendus Mathématique and in a manuscript submitted to the Journal of Algebra.

My visit in the Université Catholique de Louvain was important for me, as it has allowed me to discuss with several mathematicians that are working in my field or related fields. I had indeed the opportunity of speaking with Prof. Pierre van Moerbeke, Pierre Bieliavsky, Mélanie Bertelson and other mathematics researchers. Professor Yakov Eliashberg (Stanford university) has also given a mini-course on Symplectic Field Theory.

In Louvain-la-Neuve, I have started working on the computation of the Poisson cohomology of a singular surface, equipped with a Poisson structure that is not everywhere symplectic on the smooth part. This is very interesting because it will allow us to determine the different roles that the singularity of the surface, on one side, and of the singular locus of the Poisson structure, on the other side, play in the Poisson cohomology. At this moment, I continue working on this.

During my visit, I have also given a talk, entitled "Cohomologie de Poisson en petite dimension", where I have explained my work and my results. It has been very interesting to discuss with the researchers that have been present and to profit by their comments. I hope I will have again the opportunity to visit this university that welcomed me.