

# Vincenzo Dimonte's Scientific Report for an ESF Exchange Visit Grant

May 14, 2010

## 1 Purpose of the Visit

I've applied for an Exchange Visit Grant to visit the Kurt Gödel Research Center in Vienna from March 2010 to May 2010. I was granted eight weeks, from 1st March 2010 to 28th April 2010. The purpose of my visit was to spend a profitable time in a very active and lively research place, full of professional mathematicians, aiming to learn and communicate with other people in order to advance in my project work, form myself better and collect hints on open problems that I've not considered in my project work but that are nonetheless important. My project work consisted in trying to find consistency-wise results that generalize the ones in my thesis with forcing methods: my thesis consisted in an analysis of some properties of elementary embeddings  $j$  from  $L(N)$  to itself, with  $V_{\lambda+1} \subset N \subset V_{\lambda+2}$  and  $\lambda$  the supremum of the critical sequence of  $j$ , whose existence is stronger than  $I_0$ , the strongest large cardinal hypothesis until now.

## 2 Description of Work Carried Out During the Visit

I've followed all the activities in the Center, including a course of lectures on Selected Topics in Set Theory given by Prof. Friedman (two hours per week), Project Seminars given by PhD Students (two hours per week) and one high level Research Seminar per week given by important guests, visitors and members of KGRC. I've also been able to give a detailed talk about my thesis during one of this seminars. I've been given a desk and a computer with an access to all the articles I needed, so I could carry on with my research without any problems. Moreover, my research was eased by the fact that in the Center there were many experienced and helpful colleagues with whom I could share any doubt.

### 3 Description of the Main Results Obtained

Under the pressure of having to present my results in detail to a qualified audience, I've managed to strengthen some weak points in my thesis, and to slightly generalize some proofs. For example, while in my thesis I've found only one  $N$  such that every elementary embedding  $j : L(N) \prec L(N)$  is non-proper, now I'm able to prove that there are many, and I've found a way to define them. I've made some steps forward in my project work: before applying forcing to hypotheses stronger than  $I_0$ , I've considered classical results of lifting for weaker axioms and applied them to  $I_0$ . This led to a series of results that maybe are not worth an article (even if I couldn't find them in literature), but that are a strong base for future developments. During this period I've also continued my study of Woodin's notes and I've collected information that can lead to results on a big open problem in this new theory (does it exist a non-proper elementary embedding  $j : L(X, V_{\lambda+1}) \prec L(X, V_{\lambda+1})$ ?).

### 4 Projected Publications/Articles Resulting from the Grant

There cannot be a publication/article that fully result from the grant. However, the results I've obtained will be a solid base for future developments.