Scientific report for the INFTY short visit grant (4910) Michal Doucha

The purpose of the visit was to attend the Young set theory workshop at CIRM (Centre International de Rencontres Mathematiques), Luminy, France; a workshop with aim to bring Ph.D. students and other young researchers in set theory to communicate with each other and learn from tutorials provided by experts in that field.

Regarding tutorials, as my work is related to applications of descriptive set theory in mathematics (mathematical analysis) the most beneficial tutorials for me were those of Alain Louveau and Ilijas Farah. Alain Louveau provided a tutorial on methods of effective descriptive set theory that are often used in proving various dichotomies in theory of Borel equivalence relations, my main research topic recently. Ilijas Farah provided a tutorial on use of (descriptive) set theory in classification theory of C*-algebras, one of the main types of applications of descriptive set theory to mathematical analysis nowadays and possibly a future research interest for me.

Besides the tutorials and lectures of invited speakers, I discussed some of my recent results with other participants, mainly with Marcin Sabok who is a coauthor of a book "Canonical Ramsey Theory on Polish Spaces" which is now being written by him, Vladimir Kanovei and my Ph.D. supervisor Jindrich Zapletal and most of my work relates to the topic of this book. That result can be summarized in the following theorem:

Theorem Let E be an equivalence relation on ω^{ω} that is Borel reducible to an equivalence relation E_I on 2^{ω} given by some F_{σ} P-ideal I. Let $B \subseteq \omega^{\omega}$ be an analytic set positive in the Laver ideal, i.e. it contains all branches of some Laver tree T. Then there is a Laver subtree $S \subseteq T$ ([S] is a positive subset of B) such that either $E \cap [S] \times [S] = [S] \times [S]$ or $E \cap [S] \times [S] = \mathrm{id}([S])$.

We were talking about the proof and next possible future directions.

The workshop started on April 30th in the morning and ended on May 4th afternoon. I arrived to Marseille, Luminy on April 29th and left on May 5th.