

# **11<sup>th</sup> International Workshop on Set Theory**

## **Meeting 417, CIRM, Luminy**

October 4-8, 2010

Organized by:

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### **Report by the Organizers**

This was the 11<sup>th</sup> meeting in a series of workshops in Set Theory organized at the CIRM, Luminy, near Marseille. The meeting was sponsored by the French Mathematical Society (SMF) and in addition to the SMF; it received financial support from the CNRS, Mathematical Institute of Jussieu, the Group in Analysis, University Pierre et Marie Curie, the Group in Mathematical Logic, University de Paris 7 – Diderot and the European Science Foundation INFTY network. There were 51 participants from 13 different countries. The scientific level of the meeting was extremely high; among the participants were most of the leading researchers in this subject in the world. There were 9 invited speakers at the International Congress of Mathematicians; there were also 4 promising graduate students and a number of young researchers mostly from Europe. There were 6 female participants, which is still low but is higher than in the past.

The scientific program consisted of two mini courses of 3 lectures each given by Ben Miller and Hugh Woodin and 22 lectures of 30 or 50 min. There was ample time for research collaboration in small groups, which rendered the meeting very relaxed, enjoyable and productive.

### **Scientific highlights of the workshop**

Hugh Woodin presented in his mini course some new dramatic developments in the search for the canonical inner model for large cardinals such as supercompact cardinals and beyond. This is an ongoing project which has involved some of the leading researchers in this field for the last 30 years. Progress in this area has been incremental but Woodin's work points to a successful completion of this project. In the second mini course Ben Miller presented his approach to dichotomy theorems in descriptive set theory. This is a very active and fruitful area which has numerous interactions with other fields of mathematics. Miller's approach allows him to avoid the use of effective methods in these results and to give a unified proof of numerous results in this area.

Among other exciting developments Justin Moore presented his recent work with Paul Larson and David Aspero on forcing axioms and the Continuum Hypothesis. In particular, they show that there is no maximal forcing axiom compatible with CH, which is in striking contrast to the situation in which CH is not required to hold. Matteo Viale presented his recent joint work with Christoph Weiss in which they show that any reasonable way to obtain the Proper Forcing Axiom (PFA) requires a supercompact cardinal. It should be pointed out that the exact consistency strength of PFA is one of the central open problems in set theory. In his talk Grigor Sargsyan showed an improved lower bound for the consistency strength of the negation of the square principle and Andrés Caicedo showed how Miller's ideas can be extended and generalized to obtain dichotomy results in the universe  $L(R)$ . It would take too long to mention all the other exciting new results which were presented in the meeting. The detailed program and slides from the talks have been posted on the internet at

<http://ests.wordpress.com/2010/11/12/11th-international-workshop-on-set-theory-scientific-program/>

### **Assessment of the results and impact of the event**

Over the past 20 years the bi-annual Luminy workshops have become one of the key events in Set Theory. The consistently high levels of the scientific program as well as the very pleasant environment have contributed to establishing a tradition of scientific excellence combined with an enjoyable and relaxed atmosphere. These meetings provide a unique opportunity for young researchers to interact with the leading experts, learn about the most important developments and discuss future directions in this subject. They have no doubt played an important role in the resurgence of scientific activity in Set Theory in France and, more generally, in Europe. The financial support of the European Science Foundation has added visibility and prestige to this conference. We intend to continue this tradition in 2012 and beyond. One aspect which we plan to emphasize in the future is interactions with other areas of mathematics. We also plan to invite more female participants and scientists from developing countries.

Alain Louveau  
Boban Velickovic

## SCIENTIFIC PROGRAM:

**MONDAY, October 4 2010**

MORNING

9:20 – 9:50 S. GESCHKE (University of Bonn, Germany)

**2-dimensional convexity revisited**

10:00-10:30 P. KOSZMIDER (Technical University of Lodz and Polish Academy of Sciences)

**Indecomposable Banach spaces of large densities**

10:30 – 11:00 Coffee break

11:00 – 12:15 B. MILLER (University of Muenster, Germany)

**Graph-theoretic dichotomies in descriptive set theory**, mini course lecture I

AFTERNOON

16:00 – 16:50 J. MOORE (Cornell University, Ithaca, USA)

**No  $\Pi_2$  maximal theory with CH**

17:00-17:30 A. BLASS (University of Michigan, Ann Arbor, USA)

**Forcing with ultrafilters and forcing ultrafilters**

17:30-18:00 Coffee break

18:00-18:50 S. FRIEDMAN (University of Vienna, Austria)

**Shelah classification and higher descriptive set theory**

19:00-19:30 H. MILDENBERGER (University of Freiburg, Germany)

**The minimal cofinality of an ultrafilter can be larger than the successor of the bounding number**

**TUESDAY, October 5 2010**

MORNING

9:00 – 9:50 M. DZAMONJA (University of East Anglia, Norwich, UK)

**SUSIFA- a forcing axiom at the successor of a singular cardinal**

10:00 – 10:30 K. THOMPSON (University of Vienna, Austria)

**Generalizations of scattered orders**

10:30 – 11:00 Coffee break

11:00 – 12:15 B. MILLER (University of Muenster, Germany)

**Graph-theoretic dichotomies in descriptive set theory, mini course lecture II**

AFTERNOON

16:00-16:30 J. CUMMINGS (Carnegie Mellon University, Pittsburg, USA)

**The tree property revisited**

16:40-17:10 D. LECOMTE (Université de Pierre et Marie Curie, Paris)

**Potential Wadge classes**

17:10-17:30 Coffee break

17:30-18:20 M. FOREMAN (University of California, Irvine, USA)

**An anti-classification theorem for measure preserving diffeomorphisms of the torus**

18:30-19:20 S. SOLECKI (University of Illinois, Urbana, USA)

**Tukey reductions and the structure of the classes of  $\mathcal{P}$ -ideals and  $\sigma$ -ideals**

**WEDNESDAY, October 6 2010**

MORNING

9:15-10:30 B. MILLER (University of Muenster, Germany)

**Graph-theoretic dichotomies in descriptive set theory, mini course lecture III**

10:30-11:00 Coffee break

11:00-12:15 H. WOODIN (University of California, Berkeley, USA)

**Long extenders, iteration hypotheses, and ultimate  $\mathcal{L}$ , mini course lecture I**

**THURSDAY, October 7 2010**

MORNING

9:00-9:30 M. ZEMAN (University of California, Irvine, USA)

**Covering arguments for the core model at small cardinals**

9:40-10:10 S. GAO (University of North Texas, Denton, USA)

**Extensions of partial colourings on countable groups**

10:10 – 10.45 Coffee breaks

11:45-12:30 H. WOODIN (University of California, Berkeley, USA)

**Long extenders, iteration hypotheses, and ultimate  $L$ , mini course lecture II**

AFTERNOON

16:00-16:30 M. VIALE (University of Torino, Italy)

**Accessible versions of strongly compact and supercompact cardinals**

16:40-17:10 C. ROSENDAL (University of Illinois, Chicago, USA)

**Finitely approximable groups and actions**

17:10-17:40 Coffee break

17:40-18:10 A. TORNQUIST (University of Vienna, Austria)

**Conjugacy, orbit equivalence and von Neumann equivalence of actions of free non-amenable groups**

18:20-18:50 A. RINOT (Ben Gurion University, Beer Sheva, Israel)

**A unified approach to higher Souslin trees constructions**

19:00-19:30 A. CAICEDO (Boise State University, USA)

**$\aleph_0$ -dichotomies for infinity-Borel sets**

**FRIDAY, October 8 2010**

MORNING

9:00-9:30 J. BRENDLE (Kobe University, Japan)

**Combinatorics of  $F_\sigma$  quotients**

9:40-10:10 G. SARGSYAN (UCLA, Los Angeles, USA)

**On the strength of square**

10:10-10:40 I. NEEMAN (UCLA, Los Angeles, USA)

**Countable linear orders in reverse mathematics**

10:40-11:15 Coffee break

11:15 -12:30 H. WOODIN (University of California, Berkeley, USA)

**Long extenders, iteration hypotheses, and ultimate  $L$ , mini course lecture III**