Assuming property $(E)$, we show that this nonforking is a well-behaved notion of independence. In particular, it satisfies symmetry and uniqueness and has a corresponding U-rank. We find sufficient conditions for a universal local character and derive superstability-like property from little more than categoricity in a "big cardinal." Finally, we show that under large cardinal axioms the proofs are simpler and the nonforking is more powerful.

Chapter VI, "Tameness and Frames," combines tameness and Shelah's good $\lambda$-frames. This combination gives a very well-behaved nonforking notion in all cardinalities. This helps to fill a longstanding gap in classification theory of tame AECs and increases the applicability of frames. Along the way, we prove a complete stability transfer theorem and uniqueness of limit models in these AECs.

Chapter VII, "A Representation Theorem for Continuous Logic," details a correspondence between first-order continuous logic and $L_{\omega_1,\omega}$. In particular, for every continuous object (language, structure, etc.), there is a discrete analogue. This discrete analogue requires an infinitary description to ensure the range of the (analogue of the) metric has range in the real numbers. This correspondence can be inverted and we extend it to types and saturation.

Chapter VIII, "A New Kind of Ultraproduct," explores a tension revealed in Chapter VII: first-order continuous logic is compact, but $L_{\omega_1,\omega}$ is, in general, not. The explanation for this tension is the Banach space ultraproduct. This chapter develops a general model-theoretic construction $\Pi^\Gamma M_i/U$ that attempts to capture the properties of the Banach space ultraproduct.

Chapter IX, "Some Model Theory of Classically Valued Fields," applies some ideas from classification theory to a specific AEC: the class of classically valued fields. The main tool is the analytic ultraproduct, but its development is entirely self-contained. The classic version of Łoś' Theorem fails for this ultraproduct, but an approximate version is proved.

Abstract prepared by Will Boney
*E-mail*: wboney@math.harvard.edu
*URL*: http://www.math.cmu.edu/∼rami/BoneyThesis.pdf

Tomás Ibarlucía, ***Model Theory Methods for Topological Groups***, Université de Lyon, 2016. Supervised by Itaï Ben Yaacov. MSC: Primary 22F50, Secondary 03C98, 54H20. Keywords: automorphism groups, $\aleph_0$-categorical structures, continuous logic, topological dynamics.

### Abstract

This thesis gathers different studies approaching subjects of topological dynamics by means of logic and descriptive set theory, and conversely.

The first part is devoted to the study of Roelcke precompact Polish groups, which are the same as the automorphism groups of $\aleph_0$-categorical structures. They form a rich family of examples of infinite-dimensional topological groups, including several interesting permutation groups, isometry groups, and homeomorphism groups of distinguished mathematical objects. Building on previous work of Ben Yaacov and Tsankov, we develop a model-theoretic translation of several dynamical aspects of these groups, related to the complexity of the orbits of continuous functions and to Banach representations of associated flows, as studied by Glasner and Megrelishvili. Then we use this translation to prove some new results.

In Chapter 1, we prove that every strongly uniformly continuous function on a Roelcke precompact Polish group is weakly almost periodic. We also show that lower tame functions correspond to NIP formulas, and we use this to describe lower tame functions in a number of important examples.

In Chapter 2 (with I. Ben Yaacov and T. Tsankov), we provide a model-theoretic description of the Hilbert-compactification of oligomorphic groups, and we show that Eberlein oligomorphic groups are precisely the automorphism groups of $\aleph_0$-stable, $\aleph_0$-categorical discrete structures. We also give an account of their Hilbert-representable ambits.

In Chapter 3, we study automorphism groups of randomized structures. This gives new examples of Roelcke precompact Polish groups, and we study some associated flows. We give new proofs of several preservation results and show that Hilbert-representability is preserved

https://doi.org/10.1017/bsl.2018.32 Published online by Cambridge University Press

by randomizations. We also study the separable models of the theory of beautiful pairs of randomizations, and we classify them in the $\aleph_0$-categorical case.

The second part (with J. Melleray) studies full groups of minimal homeomorphisms of the Cantor space, and their invariant measures. Full groups are complete algebraic invariants for orbit equivalence. Their counterparts in ergodic theory enjoy good, important topological properties.

In Chapter 4, we show that, by contrast, full groups of minimal homeomorphisms do not admit a Polish group topology, and are moreover non-Borel subsets of the homeomorphism group of the Cantor space. We then study the closures of full groups by means of Fraïssé theory.

Finally, in Chapter 5 we give a characterization of the sets of invariant measures of minimal homeomorphisms of the Cantor space. We also present new, elementary proofs of some results previously established by complex means.

Abstract taken from the thesis.

MARIOS KOULAKIS, ***Coding into Inner Models at the Level of Strong Cardinals***, University of Münster, 2015. Supervised by Ralf Schindler. MSC: 03E10, 03E35, 03E45, 03E55. Keywords: large cardinals, inner model theory, independence results, strong cardinals, coding into inner models.

## Abstract

This thesis explores the possibilities of coding into inner models in the presence of strong cardinals. The first key result is that if there is no inner model with a Woodin cardinal and all strong cardinals of the core model $K$ are countable in $V$, then there is a stationary set preserving forcing extension $V[g]$ of $V$ which adds a real $x$ such that in $V[g]$, $H_{\omega_2} \subset K[x]$. The second key result is that if there is no inner model with a Woodin cardinal and $\kappa > \omega$ is a cardinal (plus some mild cardinal arithmetic hypotheses), then there is a cofinality preserving forcing extension $V[g]$ of $V$ which adds a subset $X$ of $\kappa$ such that in $V[g]$, $H_{\kappa^+} \subset K[C, X]$, where $C \subset \kappa^+$ is any set such that if $\xi < \kappa^+$ has countable cofinality in $V$, then $\xi$ has countable cofinality in $L[C]$.

The first key result has applications on forcing projective or $J_{1+\theta}(\mathbf{R})$ well-orderings of the reals, depending on the order type of the strong cardinals of $K$ below $\omega_1^V$, and on 2-step stationary forcing absoluteness for levels of $L(\mathbf{R})$.

Abstract prepared by Marios Koulakis, Ralf Schindler
*E-mail*: `marios.koulakis@gmail.com`
*URL*: `https://www.uni-muenster.de/imperia/md/content/logik/disskoulakis.pdf`

DOMINIK THOMAS ADOLF, ***On the Strength of $PFA(\aleph_2)$ in Conjunction with a Precipitous Ideal on $\omega_1$ and Namba-Like Forcings on Successors of Regular Cardinals***, WWU Muenster, 2013. Supervised by Ralf Schindler. MSC: 03E25. Keywords: core model induction, Prikry forcing.

## Abstract

**Part one:** we consider two properties, the first is a strengthening of the bounded proper forcing axiom, here referred to as $PFA(\aleph_2)$ and the second is the existence of a precipitous ideal on $\omega_1$. Individually, these properties are "weak" and they are both consistent relative to the existence of a measurable cardinal. Building on earlier work by Ralf Schindler and Ben Claverie we show, using core model induction, that inductive determinacy holds in the universe after collapsing $\omega_1$. We also show that full $AD^{L(\mathbb{R})}$ holds (in $V$) on the condition that the generic ultrapower given by our ideal respects operators over $H_{\omega_1}$ that are in $L(\mathbb{R})$.

**Part two:** we show that, given $\kappa < \mu$ regular uncountable cardinals such that $\mu$ is measurable, a trace of the Prikry forcing on $\mu$ remains even after collapsing $\mu$ to be $\kappa^+$, i.e., in the universe after the collapse there exists a forcing notion $\mathbb{P}$ that singularizes $\mu$ but does not