Research Statement

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I am a second year PhD student, working on descriptive set theory under the supervision of Damien Gaboriau and Julien Melleray.

More precisely, I am interested in Polish groups arising from II_1 factors, such as their unitary group or their automorphism group. Such factors can be obtained as von Neumann algebras of measure preserving ergodic equivalence relations. Thus, the unitary group of a II_1 factor is somewhere in between the full group of a measure preserving equivalence relation and the unitary group of an infinite dimensional Hilbert space. One example of such an analogy is given by a theorem of Giordano and Pestov [GP07] which states that the full group of the ergodic hyperfinite pmp equivalence relation, and the unitary group of the hyperfinite II_1 factor are extremely amenable.

Kittrell and Tsankov have shown in [KT10] that the full group of an ergodic pmp equivalence relation satisfies the automatic continuity property (every homomorphism into a Polish group is automatically coninuous), and recently Tsankov showed in [Tsa11] that the unitary group of an infinite dimensional Hilbert space also satisfies this property. So one can hope to show the same result for the projective unitary group of a II_1 factor by using similar techniques.

References

[GP07] Thierry Giordano and Vladimir Pestov. Some extremely amenable groups related to operator algebras and ergodic theory. *J. Inst. Math. Jussieu*, 6(2):279–315, 2007.

[KT10] John Kittrell and Todor Tsankov. Topological properties of full groups. *Ergodic Theory Dynam. Systems*, 30(2):525–545, 2010.

[Tsa11] T. Tsankov. Automatic continuity for the unitary group. *ArXiv e-prints*, September 2011.