

**Duffin- Schaeffer Conjecture
16th-18th December
The Fry Building G.07**

Day	Time	Speaker
	12:30- 13:15	Welcome Coffee, Common Room
Monday 16th December	13:15-14:15	Talk- Aistleitner
	14:15: 15:15	Talk- Pollington
	15:15-16:00	Break
	16:00-17:00	Colloquium- James Maynard- LT 2.41
	17:00- 18:30	Wine Reception- Common Room

**Duffin- Schaeffer Conjecture
16th-18th December
The Fry Building G.07**

Day	Time	Speaker
Tuesday 17th December	09:45- 10:45	Lectures on proof 1
	10:45-11:15	Break
	11:15-12:15	Lectures on proof 2
	12:15-13:30	Lunch, Common Room
	13:30-14:30	Talk- Ramirez
	14:30-15:30	Talk- Velani
	15:30-16:00	Break
	16:00-17:30	Open problem/ future discussions
	19:00	Dinner Browns, BS8 1RE

**Duffin- Schaeffer Conjecture
16th-18th December
The Fry Building G.07**

Day	Time	Speaker
Weds 18th December	09:45- 10:45	Lectures on proof 3
	10:45- 11:15	Break
	11:15-12:15	Lecturers on proof 4
	12:15- 13:15	Lunch, Common Room
	13:15- 14:15	Talk- Haynes
	14:15- 14:45	Break
	14:45- 15:45	Talk- Beresnevich

TITLES AND ABSTRACTS

Christoph Aistleitner

Title: Introduction to the Duffin-Schaeffer conjecture

Abstract: We present some of the history of the Duffin-Schaeffer conjecture, as well as some of the partial results which were obtained since the conjecture was first stated in 1941. In particular, we show how the conjecture arose as an attempt to remove the monotonicity assumption from Khintchine's theorem. We introduce the Pollington-Vaughan estimate, which allows to quantify the overlap between the sets in the Duffin-Schaeffer conjecture. Finally, we present the averaging argument of Beresnevich-Harman-Haynes-Velani, which allowed to establish an "extra divergence" form of the conjecture.

Andrew Pollington

Title: On the k-dimensional Duffin and Schaeffer conjecture

Abstract: Sprindzuk, in his book "Metric theory of Diophantine Approximation" conjectured that a version of the Duffin and Schaeffer conjecture should hold in all dimensions. In a paper which appeared in Mathematika in 1990 Bob Vaughan and I showed that this conjecture held in dimensions $k > 1$. I will describe this result as well as some special cases of the conjecture in dimension 1.

James Maynard (Colloquium)

Title: Approximating reals by fractions

Abstract: How well can you approximate real numbers by fractions with denominators coming from a given set? Although this old question has applications in many areas, in general this question seems impossibly hard - we don't even know whether $e+\pi$ is rational or not! If you allow for a tiny number of bad exceptions, then a beautiful dichotomy occurs - either almost everything can be approximated or almost nothing! I'll talk about this problem and recent joint work with Dimitris Koukoulopoulos which classifies when these options occur, answering an old question of Duffin and Schaeffer. This relies on a fun blend of different ideas, including ergodic theory, analytic number theory and graph theory.

Felipe Ramirez

Title: Duffin-Schaeffer-style counterexamples

Abstract: Duffin and Schaeffer showed by counterexample that if one removes the monotonicity assumption from Khintchine's theorem, then the resulting statement is false. That is, they showed that there exist (non monotonic) approximating functions satisfying the divergent sum condition in Khintchine's theorem, yet whose corresponding set of approximable numbers has measure zero. I will discuss such counterexamples, and analogous counterexamples in the inhomogeneous and random settings.

Sanju Velani

Title: Diophantine Approximation on manifolds: lower bounds for Hausdorff dimension

Abstract: There has recently been much activity in the theory of Diophantine approximation in which the points of interest are restricted to a sub-manifold M . I plan to provide a review of this activity. The goal is to describe a new approach based on the Mass Transference Principle which yields sharp lower bounds for the dimension of well approximable sets restricted to M .

Alan Haynes

Title: Three variants of Khintchine's theorem

Abstract: In this talk we will present analogues of Khintchine's theorem which have recently arisen in connection with problems from Diophantine approximation (the metric theory of continued fractions) and aperiodic order (averaging almost periodic functions, and the study of spiral Delone sets). In each of these three settings we are led naturally to open problems which seem accessible, but whose solutions will likely require some new ideas.

Victor Beresnevich

Title: Let's talk about approximations by algebraic numbers

Abstract: In this talk I will discuss a collection of problems and results on approximations to real numbers by algebraic numbers of a given degree. As far as possible I will mention problems and results for non-monotonic approximation functions that provide reasonable generalisations to the Duffin–Schaeffer problem.

Open Problems Sessions Contributors:

- Faustin Adiceam (10 minutes)
- Christoph Aistleitner (10 minutes)
- Victor Beresnevich (10 minutes)
- Sam Chow (10 minutes)
- Dimitris Koukoulopoulos (10 minutes)
- James Maynard (10 minutes)