



Berlin
Mathematical
School

BMS Friday Colloquium

Friday 4 November 2016 at 14:15

Tea & Cookies starting at 13:00

BMS Loft, Urania, An der Urania 17, 10787 Berlin

Maryna Viazovska

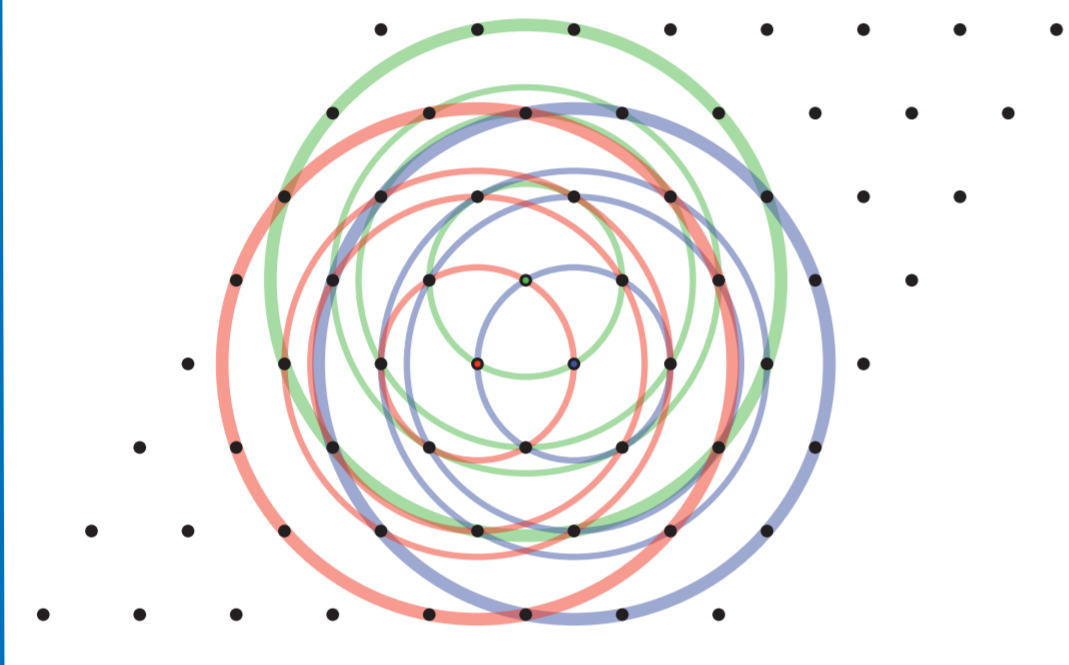
(HU Berlin)

Solving packing problems by linear programming

How much of Euclidean space can be filled with pairwise non-overlapping congruent copies of a given convex body K ? We call this the *body packing problem*. Problems of this kind are solved completely only in rare cases. One powerful method to attack these geometric questions is *linear programming*. This approach was developed by Philippe Delsarte in the early seventies. Based on inequalities for the distance distribution of point configurations, this method was successfully applied to the “kissing number problem” in dimensions 8 and 24.

The original Delsarte method was applied to the optimization on compact spaces. In 2003, Cohn and Elkies generalized this method to Euclidean space. In particular, they improved existent upper bounds for the maximum density of sphere packings in dimensions 4, ..., 36. Recently, Viazovska and her coauthors proved that linear programming provides tight bounds for sphere packing in dimensions 8 and 24. In her talk, Viazovska will explain the linear programming method and demonstrate how it works on various examples.

Born in the Ukraine, Maryna Viazovska completed her PhD at MPIM in Bonn in 2013 under the supervision of Don Zagier. Her research interests include number theory and discrete geometry. In October 2013, she became a visiting researcher at the IHÉS in France. In August 2014, she took up the two-year position of BMS Dirichlet Postdoctoral Fellow based at HU Berlin, during which time she solved the hypersphere packing problem for dimension 8. She is now a researcher at HU Berlin.



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