

Geometry Seminar
Tuesday, October 13, 2009
Room 202 WWH at 6:00 P.M.

Lattice packing of convex bodies

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Lattice packings of convex bodies can be interpreted in terms of Diophantine inequalities. This is one reason that they have attracted the interest of mathematicians. A different reason is their importance in crystallography. Major problems are:

1. the investigation of (locally) densest lattice packings,
2. the question whether lattice packings with extreme density properties are unique,
3. estimates of the kissing number of lattice packings with extreme density properties.

We make first steps in case of problem (i), showing in particular, that for most o-symmetric convex bodies in E^3 the densest lattice packing are unique. Concerning (ii), we characterize lattice packings with extreme density properties by Voronoi type properties. Examples: A lattice packing has ultra extreme density if and only if it is eutactic and perfect. In case of balls, extreme and ultra extreme lattice packings coincide. These results refine and extend Voronoi's classical criterion. Concerning (iii), we conjecture that for most o-symmetric convex bodies the kissing number of the densest lattice packing is precisely $2d^2$.

For more information please visit the seminar website at:
http://www.math.nyu.edu/seminars/geometry_seminar.html.