Triangles, Braids, and Hyperbolic Manifolds

Richard Schwartz
University of Maryland

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102 Bradley Hall, 4:00 pm
(Tea 3:30 pm Math Lounge)

Abstract

The real hyperbolic plane is a 2-dimensional space which shares some of the features of the Euclidean plane but is more exotic. The complex hyperbolic plane is a 4-dimensional space which contains the real hyperbolic plane as a lower dimensional slice. The complex hyperbolic plane is a mysterious space, which combines a bewildering variety of interesting structures–negative curvature, symplectic geometry, quaternions, the Hopf fibration, etc.–into a harmonious union. Following a gentle introduction to real and complex hyperbolic geometry, I will explain what happens when you tile the real hyperbolic plane by equilateral triangles and then crinkle this pattern up, into the complex hyperbolic plane. I recently discovered that this procedure leads to certain 3-dimensional hyperbolic manifolds, defined in terms of braids. I will try to give the flavor, if not the substance, of the discovery. My talk will feature some nice color prints which illustrate the mathematics.

This talk should be accessible to general faculty.