



GEOMETRY, TOPOLOGY, AND PHYSICS SEMINAR

Higher Chow groups, van Geemen lines, and mirror symmetry for open strings

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Room 6635 South Hall

Abstract: We shall describe a puzzle which has arisen in the study of mirror symmetry for open strings: certain calculated numbers, which naïvely would be expected to be integers, are in fact irrational algebraic numbers.

The numbers in question are related to lines on the so-called Dwork pencil of quintic threefolds, which include a positive-dimensional family of lines, the “van Geemen lines.” An ongoing quest of mine, in collaboration with Hans Jockers and Johannes Walcher, is to understand open mirror symmetry in this case.

As one step in our quest, we were led to consider higher Chow groups, and have successfully made a computation in that context (which will be the topic of a later lecture). The structure of that computation is reminiscent of the way in which hyperbolic three-manifolds are built from elementary pieces, so we are hoping to predict which hyperbolic three-manifold should serve as the mirror of the van Geemen family on the basis of this computation.

There are important connections between hyperbolic three-manifolds and algebraic number theory which may lead to an explanation of the original computation, including an *a priori* explanation of **which** number number field the computation takes values in.

This seminar is part of the NSF/UCSB ‘Research Training Group’ in Topology and Geometry. Information about future meetings can be found at <http://www.math.ucsb.edu/~drm/GTPseminar/>