

BI-CO MATHEMATICS COLLOQUIUM

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*“The Rigidity Transition in
Random Graphs”*

Monday, March 14, 2011

Talk at 4:15pm – KINSC H109

Tea at 4:00pm – KINSC Math Lounge, H208

ABSTRACT: As we add rigid bars between points in the plane, at what point is there a giant (linear-sized) rigid component, which can be rotated and translated, but which has no internal flexibility? If the points are generic, this depends only on the combinatorics of the graph formed by the bars, so we can just think in terms of how many edges we've added to a "random graph".

Cris Moore, Shiva Kasiviswanathan, and I showed that at about around $1.79n$ edges a "phase transition" from no rigid components at all to a very large fraction (we conjecture $\sim 75\%$) of the points in a single big rigid components happens with very high probability. This confirms theoretically predictions made in simulation by physicists studying phase transitions in glasses.