Testing for Hyperuniformity in Two Dimensional Foam ANTHONY CHIECO, DOUGLAS DURIAN, University of Pennsylvania, SALVATORE TORQUATO, Princeton University — It has been conjectured that all maximally random, strictly jammed, saturated systems are hyperuniform, i.e. the standard deviation of the number, N, of particles inside a region goes like the square root of the number, N_b, of particles on the boundary. By contrast, for a normal system the standard deviation of N goes like the square root of N. We study a two dimensional dry foam, which is a heterogeneous media that is jammed and therefore should be hyperuniform. For foam, images are taken so that the grayscale values are high in the liquid phase and zero in the gas phase. To test for hyperuniformity, grayscale values are then considered as proxy for the number of particles in each pixel. We probe our system by randomly placing many windows throughout an image to find an average number, <N>, of particles for the whole sample and calculate the standard deviation of N for each set of windows. Our preliminary results show that the system appears closer to normal than hyperuniform but we are examining larger sample sizes in order to get a definitive conclusion.

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