Superfluid Glass of He-4
BORIS SVISTUNOV, University of Massachusetts, MASSIMO BONINSEGNI, University of Alberta, NIKOLAY PROKOF’EV, University of Massachusetts — With a recently developed worm algorithm, we simulate 800 atoms of He-4 at the density corresponding to the zero-$T$ melting point of the hcp crystal. We find that low-$T$ properties of the system— in our case, at $T = 0.2K$—crucially depend on the initial state and cooling protocol. An ideal hcp crystal is a clear-cut insulator. But if we start with a high-$T$ liquid state and quench-cool the sample down to $T = 0.2K$, we end up with a new state of matter, ’superglass’,—a metastable amorphous solid that features off-diagonal long-range order and superfluidity.