The classic energy minimization problem asks which configuration(s) of N points on the 2-sphere minimize the total potential energy when it is computed with respect to a power law potential. When N=2,3,4,6,12 the answer the obvious one (e.g., a regular tetrahedron or octahedron). I'll explain work I did for the case N=5, which proves that the best configuration is a triangular bi-pyramid when the power law potential is less than about 15.05, and then the answer switches to some pyramid with square base. This "phase transition" had been noticed experimentally in the late 70s.

Rich Schwartz works on problems in geometry and dynamics, often using computational techniques. He completed his PhD at Princeton, and has held positions at Maryland and the Institute for Advanced Study. In addition, he is a bestselling author of mathematics picture books for children.

Related Links:
Richard Schwartz, Brown University
Pacific Institute for the Mathematical Sciences