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Corey Shanbrom* (corey.shanbrom@csus.edu) and **Victor Dods**. *Self-similarity in the Kepler-Heisenberg problem*. Preliminary report.

The Kepler-Heisenberg problem is that of determining the motion of a planet around a sun in the Heisenberg group, thought of as a three-dimensional sub-Riemannian manifold. The sub-Riemannian Hamiltonian provides the kinetic energy, and the gravitational potential is given by the fundamental solution to the sub-Laplacian. The dynamics are at least partially integrable, possessing two first integrals as well as a dilational momentum which is conserved by orbits with zero energy. The system is known to admit closed orbits of any rational rotation number, which all lie within the fundamental zero energy integrable subsystem. Here, we demonstrate that all zero energy orbits are self-similar. (Received August 14, 2019)