The mathematical problem of group synchronization deals with the question of how to estimate unknown group elements from a set of their mutual relations. This problem appears as an important step in solving many real-world problems in vision, robotics, tomography, and more. In this talk, we present a novel solution for synchronization over the class of Cartan motion groups, which includes the special important case of rigid motions. Our method is based on the idea of group contraction, an algebraic notion origin in relativistic mechanics.