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*Modified Spheres*

A long standing problem in rigidity theory is to characterize the graphs which are isostatic (rigid and independent) in 3-space. The results of Cauchy (1813), Dehn (1916), and Alexandrov (1950) give one important class: the triangulated convex spheres. In 2012, Whiteley and I provided a second class of 3-dimensional isostatic frameworks, the block and hole polyhedra, along with methods to verify generic rigidity. These methods are based on tracking when a larger framework can be derived from a known small example using vertex splitting, an operation known to take a minimally generically rigid framework to a new minimally generically rigid framework with one more vertex. In this talk we use these methods to investigate more general frameworks: triangulated spheres with an edge removed and an added crossbeam connecting some two non-adjacent vertices.