Gap Sets for the Spectra of Cubic Graphs

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November 23, 2020

The spectra of large locally uniform geometries have been studied widely and from different points of view, including in applications. They include Ramanujan Graphs and Buildings, euclidean and hyperbolic spaces and more general locally symmetric spaces. We review some of these briefly highlighting rigidity features. We then focus on the simplest case of finite cubic graphs which prove to be surprisingly rich. As one imposes restrictions on these graphs, planarity, fullerenes,... their spectra become rigid. Joint work with Alicia Kollar and Fan Wei.