Geometry, Physics, and Representation Theory
Northeastern University

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Hyperplane arrangements and five-dimensional supersymmetric gauge theories

Abstract. The Coulomb phases of five-dimensional supersymmetric gauge theories have an interesting polyhedral geometry that can be described by a hyperplane arrangement $I(\mathfrak{g}, R)$ characterized by a representation R of a reduced Lie algebra $\mathfrak{g}$ inside the fundamental Weyl chamber of the Lie algebra. I will explain how counting flats and faces of this polyhedral geometry can be done using the Cartesian order on the quartic discrete plane. The resulting counting numbers give precious information on the structure of (partial) resolutions of certain elliptic fibrations and enumerate the mixed Coulomb-Higgs phases of the supersymmetric theory.