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The L-infinity origin of tree-level scattering amplitude recursion relations

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Higher algebraic structures are ubiquitous in fundamental physics. For instance, A_∞- and L_∞-algebras emerge in the context of string field theory. Importantly, via the Batalin-Vilkovisky formalism, any Lagrangian field theory admits an L_∞-algebra that governs all of its physics including field equations, symmetries, and Noether identities. In this talk, I will explain the connection between higher algebraic structures and tree-level scattering amplitudes. In particular, I will prove that powerful recursive methods, such as the Berends-Giele gluon scattering recursion relation, emerge very naturally and straightforwardly in any Lagrangian field theory when using the L_∞-algebra language.

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