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Classifying all Feynman integral geometries for two-loop particle scattering

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In this talk, we provide a complete classification of the Feynman integral geometries at two-loop level in four-dimensional Quantum Field Theory. Concretely, we consider a basis of 79 Feynman integrals in the 't Hooft–Veltman scheme, i.e. with d -dimensional loop momenta and four-dimensional external momenta, and calculate leading singularities for generic values of the masses and momenta. We find that only elliptic curves, hyperelliptic curves of genus 2 and 3 as well as K3 surfaces occur. These geometries determine the space of functions relevant for Quantum Field Theories at two-loop order, including in the Standard Model.

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