The **2017 Gribov Medal** for outstanding work by a young physicist in Theoretical Particle Physics and/or Field Theory is awarded to Simon Caron-Huot “for his groundbreaking contributions to the understanding of the analytic structure of scattering amplitudes and their relation to Wilson loops.”

The theory of strong interactions, Quantum Chromo Dynamics plays a central role in interpreting the data collected by the experiments of the Large Hadron Collider because the interaction between the elementary particles in the colliding protons – quarks and gluons – is mediated by the strong force. The high precision data collected by the experiments call for high precision description by the theory. Such high precision predictions require the computation of loop amplitudes, which is a formidable task by the standard Feynman graph approach. In the last decade more efficient methods – on-shell techniques for computing the scattering amplitudes directly – have been developed to simplify and enable new calculations, which in turn lead to enormous improvement in making high-precision predictions for cross sections. These new techniques have also proved useful to uncover deep analytic structures of scattering amplitudes.

The works of the awardee of the 2017 Gribov Medal have revolutionised our understanding of the analytical structure of scattering amplitudes and their relation to Wilson loops. Simon Caron-Huot (McGill University) was a key contributor to finding an explicit recursive formula for the all-loop integrand of scattering amplitudes in $\mathcal{N}=4$ supersymmetric Yang-Mills theory in the planar limit [1]. This formula generalised the celebrated Britto-Cachazo-Feng-Witten recursive formula for tree amplitudes to all loop orders and extended the Grassmannian duality for leading singularities to the full amplitude – a discovery, described by David Gross as “we have found the hydrogen atom of quantum field theory” [2]. His most important achievement was the extension of the duality between the four-dimensional $S$-matrix of planar maximally supersymmetric Yang-Mills theory and the expectation value of polygonal shaped Wilson loops in the same theory to amplitudes with arbitrary helicity states by introducing a suitable supersymmetrization of the Wilson loop [3], which is called the “Wilson-Loop/Amplitude duality for general helicities”. This discovery fosters the computation of loop amplitudes in gauge theories, needed for the evaluation of higher order radiative corrections. His influential contributions span a wide spectrum of topics, for example in proposing a systematic way of bootstrapping all-loop order results for the integrated amplitudes, or in explaining how the dual conformal symmetry of $\mathcal{N}=4$ supersymmetric Yang-Mills theory contains and generalises the ancient “Runge-Lenz” symmetry of the Kepler problem. Most recently he proposed a completely new strategy for determining loops in terms of trees in any quantum field theory, and determined the asymptotic universality of the Veneziano amplitude for any consistent theory with massive higher-spin resonances.

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