



ICTS

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TATA INSTITUTE OF FUNDAMENTAL RESEARCH

### ICTS String Seminar

**Title** : Seeing through the confinement screen: DGLAP/BFKL mixing and light-ray matching in QCD

**Speaker** : David Simmons-Duffin (California Institute of Technology, USA)

**Date** : Monday, 29 September 2025

**Time** : 10:00 AM (IST)

**Abstract** : We argue that collider observables such as hadron number flux can be matched onto a linear combination of detectors/light-ray operators in perturbative QCD. The spectrum of detectors in QCD is subtle, due to recombination between the DGLAP and BFKL trajectories. We explain how to define and renormalize these trajectories at one-loop, systematically incorporating their recombination. The leading and subleading soft gluon theorems play an important role, and our analysis suggests the presence of an infinite series of further subleading soft theorems for squared-amplitudes/form factors. Combined with our light-ray matching hypothesis, the anomalous dimensions of recombined DGLAP/BFKL detectors yield a prediction for the energy dependence of the number of particles in a jet, as well as other predictions for more general energy-weighted hadron measurements. We compare these predictions to Monte-Carlo simulations, finding good agreement.

**Venue** : Online

Zoom Link: <https://icts-res-in.zoom.us/j/88092766911?pwd=R3ZrVk9yeW96ZmQ4ZG9KRzVhenRKZz09>

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