



Contribution ID: 31

Type: **not specified**

## Transverse degrees of freedom in QCD: momenta, spins and more

Light-front quantized quark and gluon states (partons) play a dominant role in high energy scattering processes. The initial state in these processes is a mixed ensemble of partons, while any produced pure partonic state appears as a mixed ensemble in the 3D world of the detector. The transition from collinear hard physics to the 3D structure including partonic transverse momenta is related to confinement and might hint at a more fundamental link between color and spatial degrees of freedom. Wilson loops, including Wilson lines along light-like directions such as used in the studies of transverse momentum dependent distribution functions (TMDs) might play a role here, establishing a direct link between transverse spatial degrees of freedom and gluonic degrees of freedom. They lead to many peculiarities among them single spin asymmetries in the physics of TMDs but they also unify and simplify our picture for gluons in the low- $x$  domain.

**Author:** MULDER, Piet (VU/Nikhef)

**Presenter:** MULDER, Piet (VU/Nikhef)