

# Gluon TMDs and quarkonium production in (un)polarized proton-proton collisions

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In this talk, I discuss how the study of quarkonium production in unpolarised and polarised proton-proton collisions can provide important insights on the gluon TMDs. The study of back-to-back production of quarkonium + isolated photon provides a unique way to extract the gluon TMDs  $f_1^g$  and  $h_1^{\perp,g}$  at the LHC [1] and at a proposed Fixed-Target Experiment at the LHC (AFTER@LHC). Although with smaller rates [2], Psi+Z and Upsilon+Z also offer interesting prospects at LHC energies. In addition, Quarkonium + isolated photon can also be used to extract the gluon Sivers function via Transverse Single Spin Asymmetries (TSSA), complementing the possible study of low- $p_T$  C-even quarkonium TSSA. Finally, I will comment on the additional information which can be obtained through J/psi-pair production in both unpolarised and polarised proton-proton collisions, extending our previous work [3].

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