

भौतिकशास्त्र विभाग,

लोकमान्य टिळक भवन,

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मुंबई - ४०० ०९८ (भारत).

दूरध्वनी : २६५४ ३३५८ (कार्यालय)

: २६५२ ८८३५ (विभागप्रमुख)

थेट दूरध्वनी क्रमांक : २६५२ ६२५०

फॅक्स : २६५२ ९७८०/२६५२ ८८३५

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Pre Synopsis Presentation on

“Study of Single Spin Asymmetries in Hadroproduction and Leptoproduction of Prompt Photons”

For the partial fulfilment of PhD Degree in Physics

By

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Research Scholar

supervised by

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Transverse single spin asymmetries (TSSAs) observed in high energy scattering experiments offer novel ways to understand three dimensional structure of the proton. These SSAs can be explained using transverse momentum dependent factorization of perturbative quantum chromodynamics. In this approach, SSAs are governed by spin-dependent transverse momentum dependent parton distribution functions (TMD PDFs). One of the important TMDs is Sivers function, which encodes the correlation between spin of the proton and orbital motion of partons inside proton. Over the past years, many experimental and theoretical efforts have been made to study quark Sivers function (QSf) but the gluon Sivers function (GSF) still remains poorly studied. In this presentation, we present estimates of TSSAs in prompt photon production in the scattering of unpolarized beams of protons/leptons off transversely polarized proton target and discuss the possibility of using these as a probes to get information about the gluon Sivers function (GSF). We apply generalized parton model (GPM) and color gauge invariant generalized parton model (CGI-GPM) for obtaining the asymmetry. Our predictions indicate that measurement of TSSA in prompt photon production, both in proton-proton and lepton-proton scattering, in the negative rapidity region would be useful for the extraction of GSF. We find that both f-type and d-type GSFs contribute to the asymmetry in proton-proton scattering while only f-type GSF contributes to the asymmetry in lepton-proton scattering in CGI-GPM. These observations will be useful to constrain f-type GSF and to distinguish between the GPM and CGI-GPM.

Date and Time: Tuesday, Jul 27, 2021, 11am – 12pm

Venue: Google Meet: meet.google.com/hui-jymz-tvu

AMisra

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