Measurements and physics channels

Physics measurement	Channel
Longitudinal spin structure	Inclusive jet and dijet measurements
Sivers asymmetry, special focus on gluons	Jet, lepton-jet and di-jet measurements
Electroweak structure functions, charge currents	Jets, flavor separated jets, Longitudinally polarized reactions ep, parity violating
TMDs, nuclear broadening, energy loss	D-jets and photon/lepton tagged jets, ep, eA
Longitudinal and transverse (TMD) fragmentation, shapes and splitting functions	Inclusive jet measurements -> hadrons in jets, energy flow, angularities
Energy loss and hadronization	Heavy mesons cross sections in comparison to light mesons in ep, eA
Charm and beauty content of nucleons and nuclei	Heavy flavor-tagged jets, ep, eA
Flavor and mass dependence of parton showers	Heavy flavor-tagged jet substructure, ep, eA, quarkonia in jets
Extraction of fundamental parameters, hadronization constants, α_s	Global event shapes, thrust, angularities, N-jettiness

Polarized reactions

Physics goals + channel	Money plots	Bonus plots	Detector requirements
Nucleon structure, helicity distributions Jet and dijet A_{LL}	A_{LL} vs jet p_T and for various η bins	Δq and Δg vs x and Q^2	Polarimetry Luminosity, Forward, central and backward acceptance, Calorimetry,Tracking
Nucleon structure, 3D, Sivers asymmetry, TMD evolution, transversity Jets, di-jets, lepton-jets	Quark sivers function of x, k_T Q^2 dependence of the Sivers function	A_N as a function of angle (away from back-to-back) Gluon Sivers function	Polarimetry, Luminosity, Forward, central and backward acceptance, Calorimetry, Tracking

For these and the next slides, we identified interest and an initial (small) workforce for each topic; help would be very welcome - contact any of us.
Overlap in all areas with EICUG software w.g.; known other overlap e.g. with SIDIS.

Unpolarized reactions, light flavor jets

Physics goals + channel	Money plots	Bonus plots	Detector requirements
TMD physics, Nuclear broadening Di-jets, photon/lepton-jet correlations	Dijet angular distributions Lepton-jet angular distributions. Different rapidity, $p_{T,}$ bins	TEEC vs azimuthal angle Photon-jet correlations and asymmetries in eA, comparison to ep	Detector acceptance; Calorimetry, Tracking, Particle ID (lepton, photon)
Fragmentation (TMD, longitudinal), fundamental QCD splitting processes Inclusive jet substructure, hadron in jet	Hadron distribution in jets vs k_T (relative to jet axis) and vs z	Light flavor jet momentum sharing distributions vs angle r, splitting fraction z Modification of shapes and fragmentation functions (vs r, z), angularities	Detector coverage; Calorimetry, Tracking, Particle ID, Granularity, Tracking resolution

Heavy Flavor

Physics goals + channel	Money plots	Bonus plots	Detector requirements
Hadronization and energy loss D, B meson production, modification in eA	D, B meson and light h R_{eA} vs z_h D, B meson cross sections vs p_T	D, B meson and light h R_{eA} vs Q^2, v Also vs k_T	Tracking, Vertexing, Particle ID, Calorimetry, Forward coverage
Charm and bottom content of nucleons and nuclei Heavy-flavor tagged jet cross section	Charm - tagged jet cross sections vs p_T, Charm F_2 (vs x Q^2)	Bottom tagged jet cross sections vs p_T, Bottom F_2 (vs x Q^2)	Tracking, Vertexing, Particle ID, Calorimetry, Forward, Central, and Backward coverage
Mass dependence of parton showers Heavy flavor jet substructure	Heavy flavor splitting functions vs r (angle) and z Heavy flavor jet shapes vs r	Fragmentation in jets to heavy mesons vs z and p_T (relative to jet axis) Substructure modification in eA Quarkonia in jets	Tracking, Vertexing, Particle ID, Calorimetry

EW and Angularities

Physics goals + channel	Money plots	Bonus plots	Detector requirements
Electroweak structure functions Parity violating reactions with jets, Charge currents	Charge current cross sections vs Jet p_T , rapidity $F_1^{\gamma Z}$, $F_3^{\gamma Z}$ vs x in bins of Q^2 (polarized x polarized) $g_1^{\gamma Z}$, $g_5^{\gamma Z}$ vs x in bins of Q^2 (unpolarized x polarized)	$\sin^2\theta_W$ vs scale Q Present structure functions vs x, Q	Polarimetry, Luminosity, Tracking, Calorimetry
Extraction of α_s, hadronization parameters Global event shapes	Thrust distribution as a function of τ for several x and Q^2 bins Angularity vs τ for several α parameters	α_s and hadronization parameter Ω_1 scatter plot	Forward, central and backward coverage, Calorimetry, Tracking.

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