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Sivers Function in the Quasi-Classical Approximation[1] MATTHEW SIEVERT, YURI KOVCHEGOV, Ohio State Univ - Columbus — We study the origin of the Sivers function in the quasi-classical limit (McLerran-Venugopalan model), applicable when the density of color charges is large. The classical limit can be achieved by a heavy nucleus, which already possesses a large number of color charges in its rest frame, or by boosting any hadron to sufficiently high energy that gluon bremsstrahlung drives up the charge density. The large charge density in the classical limit allows us to resum multiple rescatterings and permits a mean-field description, such as a hadron made up of a large number of independent low-x partons. This allows us to decompose the TMD's of the hadron in terms of the TMD's of its partons, the Wigner distributions of the partons within the hadron, and Wilson lines due to multiple rescattering. We find that the Sivers function of the hadron receives one contribution that simply aggregates the Sivers functions of the partons, and another due to the combination of orbital angular momentum and screening due to multiple rescattering. This channel is fundamentally different from the known "lensing mechanism," and it provides a simple interpretation for the process dependence of the Sivers function. This method can be readily extended to study other TMD's and to include quantum evolution.

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