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Thomas Lam and **Pavlo Pylyavskyy*** (pavlo@umich.edu). *Total positivity in loop groups.*

We study infinite products of Chevalley generators in the formal loop group. We develop the formalism of infinite sequences of braid moves, called a braid limit. We relate this to a partial order, called the limit weak order, on infinite reduced words. The limit semigroup generated by Chevalley generators has a transfinite structure. We prove a form of unique factorization for its elements, in effect reducing their study to infinite products which have the order structure of the natural numbers. (Received August 24, 2009)