Spin Transport in the XXZ Chain at Finite Temperature and Momentum\textsuperscript{1} WOLFRAM BRENIG, Technical University Braunschweig, Germany, ROBIN STEINIGEWEG, J. Stefan Institute, Ljubljana, Slovenia — We investigate the role of momentum for the transport of magnetization in the spin-1/2 Heisenberg chain above the isotropic point at finite temperature and momentum [1]. Using numerical and analytical approaches, we analyze the autocorrelations of density and current and observe a finite region of the Brillouin zone with diffusive dynamics below a cut-off momentum, and a diffusion constant independent of momentum and time, which scales inversely with anisotropy. Lowering the temperature over a wide range, starting from infinity, the diffusion constant is found to increase strongly while the cut-off momentum for diffusion decreases. Above the cut-off momentum diffusion breaks down completely.


\textsuperscript{1}Work supported in part by DFG FOR912, BR 1084/6-1, 1084/6-2, and EU MC-ITN LOTHERM PITN-GA-2009-238475.