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**Effect of charge distribution on the translocation of an inhomogeneously charged polymer through a nanopore** ARUNA MOHAN, ANATOLY KOLOMEISKY, MATTEO PASQUALI, Rice University — We investigate the voltage-driven translocation of an inhomogeneously charged polymer through a nanopore by utilizing discrete and continuous stochastic models. As a simplified illustration of the effect of charge distribution on translocation, we consider the translocation of a polymer with a single charged site in the presence and absence of interactions between the charge and the pore. We find that the position of the charge that minimizes the translocation time in the absence of pore-polymer interactions is determined by the entropic cost of translocation, with the optimum charge position being at the midpoint of the chain for a rodlike polymer and close to the leading chain end for an ideal chain. The presence of attractive or repulsive porecharge interactions yields a shift in the optimum charge position towards the trailing end and the leading end of the chain, respectively. Moreover, our results show that strong attractive or repulsive interactions between the charge and the pore lengthen the translocation time relative to translocation through an inert pore. We generalize our results to accommodate the presence of multiple charged sites on the polymer. Our results provide insight into the effect of charge inhomogeneity on protein translocation through biological membranes.

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