

Abstract Submitted
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Fast diffusive folding dynamics of Tryptophan Zipper peptides¹

STEPHEN HAGEN, Physics Dept., University of Florida, Gainesville FL 32611 — Simple synthetic peptides that fold into elemental structures like α -helices and β -hairpins serve as useful model systems for experimental and computational studies of protein folding dynamics. The folding of the Tryptophan Zippers, for example, represents an interesting case of nearly barrier-less folding. These short (12-16 residue) peptides designed by Cochran et al. (2001) fold into stable, well-defined β -hairpins on time scales of just a few microseconds. Our laser temperature-jump fluorescence spectroscopy shows that the “TrpZip” molecules encounter little internal friction and almost no enthalpic barrier as they proceed from the unfolded to the folded state: Favorable solvent conditions reduce the entropic barrier as well, until the folding dynamics become complex and diffusive, and different experimental probes see the system as folding on rather different time scales. We will present experimental signatures of these complex dynamics, discuss the role of internal polymer friction in TrpZip folding, and briefly consider suitable approaches for modeling the free energy surface that controls such a folding reaction.

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Stephen Hagen
Physics Dept., University of Florida, Gainesville FL 32611

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