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Confining individual DNA molecules in an axisymmetric entropy gradient ROBERT D. PETERS, KARI DALNOKI-VERESS, Department of Physics & Astronomy and the Brockhouse Institute for Materials Research, McMaster University, Hamilton, ON, Canada, L8S 4M1 — Many asymmetric and discontinuous confining environments have been used to study the properties of confined DNA. We have developed a unique method for studying DNA in micropipettes, resulting in a confining environment that is axisymmetric with a continuously changing entropy gradient. An applied electric field forces the chain into sub-micron confinement and fluorescence microscopy is used to track the effect of confinement on the entropy of individual DNA chains. Releasing the electric field, we probe the dynamics of the DNA chain in a continuously changing confinement, yielding a comprehensive study of the entropic force. This technique provides a novel method for studying the effect of polymer chain architecture on entropy. These architectures include knots in polymer chains, cyclic chains, or the presence of histones amongst DNA molecules.

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