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Design Of Novel Magnetic Tweezers And Its Use For Studying DNA-Compacting Proteins ROBERTO FABIAN, Physics Department, Vitreous State Laboratory, The Catholic University of America, Washington DC 20064, CHRISTOPHER TYSON, Biomedical Engineering Department, Vitreous State Laboratory, The Catholic University of America, Washington DC 20064, ANNELIESE STRIZ, PAMELA TUMA, Biology Department, The Catholic University of America, Washington DC 20064, IAN PEGG, ABHIJIT SARKAR, Physics Department, Vitreous State Laboratory, The Catholic University of America, Washington DC 20064 — We developed a novel transverse magnetic tweezers that can apply force to single DNA molecules in the horizontal plane. We use a λ -DNA attached to a $2.8 \mu\text{m}$ superparamagnetic bead on both ends. We describe the tweezers in detail and present data validating its performance. We show that using a simple design complemented with image processing techniques, we can reliably measure changes in the DNA's extension suitable for studying the binding of proteins. We conclude with a discussion of our experiments on the binding mechanism of the protein mIHF that plays an important role in the infection pathway of tuberculosis.

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