

Abstract Submitted
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Fiber Positioner System: A Method to Guide 30,000 Optical Fibers.¹ KIMIKA ARAI, Brandeis University, KIMIKA ARAI, KEVAN HASHEMI, JAMES BENSINGER TEAM — We want to build a spectroscopic telescope, which is a tool that analyzes the light of the universe. The purpose of this study is to understand the feasibility of using piezoelectric tubes (piezos) as a method of positioning 30,000 optical fibers. The goal is to precisely move and position the fibers to a given location within 10 μ m, and let them stay in that position for at least an hour. However, piezos have the properties of hysteresis and creep, which makes this significantly more challenging to do so. To combat these obstacles and gain better control of the piezos, it is necessary to learn the characteristics and quirks of the system. Therefore, this project focused mainly on understanding the behavior of the piezos under a changing voltage, as well as attempting hysteresis mitigation by experimenting with reset procedures, which, as the name implies, seeks to reset any memory that the system has of the previous state. Experiments showed that we can locate the fibers with a precision of 50 μ m in one movement.

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