Force Regulation in Living Tissue YUSUKE TOYAMA, XOMALIN G. PERALTA, Physics Department, Duke University, STEPHANOS VENAKIDES, Mathematics Department, Duke University, DANIEL P. KIEHART, Department of Biology, Duke University, GLENN S. EDWARDS, Physics Department, Duke University — Forces within tissue are involved in the shaping of an embryo. Measuring the net forces exerted by groups of cells and tissues in live organisms is a challenging endeavor. Quantitative physical modeling based on experimental results has the potential for increasing our understanding of this question. We use a developmental stage in Drosophila embryo known as dorsal closure, which to a large extent occurs in two dimensions and is a consequence of four biological processes that are synchronized in time and coordinated in space [1]. To reveal the interaction of forces and tensions within the components of these tissues, we use a steerable UV-laser microbeam to cut them and monitor the resulting behavior with confocal microscopy. We present experimental evidence for an increase in the force that could be a consequence of the laser cut supported by a quantitative model and a biological mutant. [1] M. S. Hutson, et al. Science, 300, 145 (2003).