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**Feeling for Cells with Light: Illuminating the Role of Biomechanics for Tumor Progession** JOSEF A. KAS, ANATOL FRITSCH, FRANZISKA WETZEL, TOBIAS KIESSLING, KENECHUKWU D. NNETU, MAREIKE ZINK, Division of Soft Matter Physics, Institute for Experimental Physics I, University of Leipzig, LEIPZIG SOFT MATTER GROUP TEAM — Light has been used to observe cells since Leeuwenhoek's times; however, we use the forces caused by light described by Maxwell's surface tensor to feel for the cellular cytoskeleton. The cytoskeleton, a compound of highly dynamic polymers and active nano-elements inside biological cells, is responsible for a cell's stability and organization. The optical stretcher exploits the nonlinear, thus amplified response of a cell's mechanical strength to small changes between different cytoskeletal proteomic compositions as a high precision cell marker that uniquely characterizes different cell types. Consequentially, the optical stretcher detects tumors and their stages with accuracy unparalleled by molecular biology. As implied by developmental biology the compartmentalization of cells and the epithelial-mesenchymal transition that allows cells to overcome compartmental boundaries strongly depend on cell stiffness and adhesiveness. Consequentially, biomechanical changes are key when metastatic cells become able to leave the boundaries of the primary tumor.

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