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Mass transport to suspended waveguide biosensors JASON GAMBA, CHAITANYA MURTHY, ANDREA ARMANI, University of Southern California — The response of a biosensor is controlled both by the kinetics of analyte adsorption as well as the mass transport to the device. Improving the affinity between a target molecule and the functionalized sensor can pose significant challenges in terms of biochemistry and surface chemistry. The careful design of sample flow systems presents a more convenient route for decreasing the time required for a measurement Using finite element methods, we model mass transport to a novel integrated photonic biosensor suspended within a microfluidic channel in an effort to understand how boundary layer flow patterns may be engineered to improve the transient response of the device. By monitoring the surface concentration of bound analyte over a range of inlet concentrations and vertical positions within the channel, we compare the behavior of suspended devices to that of planar sensors located on the floor of the channel. Thinner boundary layers and increased effective sensing area lead to consistently faster transient responses for the suspended sensor, with optimal performance resulting from the symmetric placement of the sensor with respect to the channel height.

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