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# Mid-infrared lab-on-a-chip for protein sensing in real-time

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## Abstract

In this work we monolithically integrate a quantum cascade laser (QCL) and detector (QCD) addressing the same wavelengths  $\lambda=1550\text{-}1650\text{ cm}^{-1}$  for liquid spectroscopy. QCL and QCD are combined using a 50-100  $\mu\text{m}$ -long dielectric-loaded surface-plasmon-polariton (DLSP) waveguide, which typically guides  $\gg 90\%$  of the mode outside of the cavity. We show the analysis of the protein bovine serum albumin (BSA) and its denaturation process between  $25^{\circ}\text{C}$ - $90^{\circ}\text{C}$  in real time in a microfluidic cell (60  $\mu\text{l}$ ) for 20-60 mg/ml BSA-concentrations. To further test the sensor-robustness, we directly submerge it into a beaker and detect H<sub>2</sub>O up to 35%-40%, solved in isopropyl alcohol.

## Conference Presentation



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