**Simultaneous sensing and imaging of fluorescent specimens by combining TIRF microscopy with a micro-ring resonator based on tapered fiber**

Amir Rahmani1

1*Laser and Plasma Research Institute, Shahid Beheshti University, Tehran, Iran*

e-mail: arahmani721313@gmaail.com

we represent our idea a fast-response and cost-effective sensing and imaging system based on simultaneous sensing of the refractive index (RI) changes with an optical ring resonator based on tapered fiber and high resolution imaging of fluorescent samples by TIRF microscopy technique. In drug delivery when people inject the drug something that happen in the vessels are not clear and for this reason we introduce this technique to examine activities in the cell membrane. This technique also provides observation of dynamics of the molecules in the cell membrane. we also predict that we can profit from this to study protein sorting.

First step of our idea is creating grating over tapered part of fiber to couple light through this part and locate the ring fiber inside the tapered fiber with a nano-gap between them. Nano-gap is the place for fixing the fluorescent specimen. Then, all of them implement on the coverslip and put on the stage above the objective lens. When laser light passed through the objective, it's coupled to the fiber and propagates through that. The laser light that propagates in the fiber has evanescent wave in nano-gap where the fluorophores are excited. Now we can image these fluorescents and sense the refractive index by output signal of fiber.