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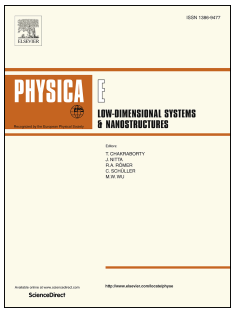


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# Highly Sensitive Nano-scale Plasmonic Biosensor Utilizing Fano Resonance Metasurface in THz Range: Numerical Study

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**Abstract**

We report a numerical study of the tunable-enhanced sensitivity of a nano-scale plasmonic biosensor in THz range. In the structure, gold Metasurface is utilized to excite of Fano resonance modes that their dispersion properties can be harnessed with different geometrical parameters. Here, the coupling of the incident beam to the surface modes of the structure is used to improve the performance parameters including figure of merit, sensitivity, and footprint. The Fano resonance, which is strongly rely on any change in refractive index of the material, is excited in the structure by changing geometrical parameters. The structure is numerically simulated by the finite difference time domain method. In the optimum design of the proposed sensor, the maximum value of sensitivity is achieved as high as S = 1700 nm/refractive

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