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## Electromagnetically induced grating in a four-level quantum system in the presence of plasmonic structure

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In this paper, we will discuss the effect of plasmonic structure on electromagnetically induced grating (EIG) of four-level semiconductor quantum dot nanostructure. The scheme of four-level semiconductor nanostructure is presented in Fig. 1. We assume this structure is located in vacuum at distance  $d$  from the surface of the plasmonic nanostructure (Fig.2). The more discussed about our proposed model is discussed in ref [2]. We show that by adjusting the distance between plasmonic nanostructure and semiconductor quantum dot nanostructure the properties EIG can be controlled easily. The properties of diffraction efficiency of the grating for different distance and relative phase between applied fields are presented in Fig.3. We found that the efficiency of grating can be improved due to adjusting the distance and relative phase easily.

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