Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Light Injection into Thin Nonabsorbing Dielectric Slabs with Graphene as Coupler FELIPE RAMOS-MENDIETA, Universidad de Sonora, ALEJANDRO HERNÁNDEZ-LÓPEZ, PALOMINO-OVANDO MARTHA, Benemérita Universidad Autónoma de Puebla, REDES PROMEP-MÉXICO COLLABORATION — Evanescent TE electromagnetic fields produced by the Attenuated Total Reflection (ATR) technique fail to excite guided modes of a thin dielectric slab. However, we found that wave guidance arises when such slab is coated on graphene. The complex optical conductivity of (the zero thickness) graphene modifies the effective dielectric constant of the dielectric slab giving place to the physical mechanism for the mode coupling. We demonstrate that in slabs as thin as 1 μm of dielectric constant of order of 2.25, the modes are excited by fields in the 30 – 70 THz regime. This is, up and down of the threshold frequency of the interband absorption, $f_{th} \sim 48$ THz, which is a characteristic of the optical conductivity of high doped graphene. The effect is not related to the surface TE plasmons of graphene because the phenomenon exists beyond the plasmonic frequency regime (41 – 48 THz). A complete theoretical study including dispersion relations and field profiles of the excited modes is presented.

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Date submitted: 14 Nov 2013 Electronic form version 1.4