

BENEMÉRITA UNIVERSIDAD AUTÓNOMA DE PUEBLA

**INSTITUTO DE FÍSICA
“LUIS RIVERA TERRAZAS”**



**SEMINARIO
“DR. JESUS REYES CORONA”**

**“ELECTROSTATIC MECHANISM OF STRONG
ENHANCEMENT OF LIGHT EMITTED BY SEMICONDUCTOR
QUANTUM WELLS”**

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The current understanding of semiconductor carrier dynamics in the presence of metals assumes that the primary interaction is *electrodynamic* in nature. This electrodynamic interaction, described by the coupling of carriers to the evanescent field of surface plasmons, shows promise for applications from light emitters to communications. However, this picture does not include contributions from electrostatics. We propose here a new *electrostatic* mechanism for carrier-metallic nanoparticle interaction comparable in effect to plasmonic interactions. Arising from Coulomb attraction of e-h pairs to metallic nanoparticles, this mechanism produces large carrier concentrations near the nanoparticle. A strong inhomogeneity in the carrier distribution and an increase in the internal quantum efficiency are predicted. In our experiments, this manifests as emission enhancement in InGaN (GaAs) quantum wells radiating in the Near-UV (Near-IR) region. This fundamental mechanism provides a new perspective for improving the efficiency of LED and other broad-band light emitters.

**Auditorio-IFUAP
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