Abstract Submitted
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Plasma Instabilities in Quantum Well Structures: Line Shape Signature.[1] P. BAKSHI, C.G. DU, K. KEMPA, Boston College — We have shown [1,2], that a resonant interaction of depolarization shifted emission and absorption modes would lead to a plasma instability in quantum well structures. This is an attractive crossing of the two modes, leading to a merging, with the frequency locked-in over a range of applied biases. There is also a line narrowing, arising from an effective reduction of the collisional damping, due to the nascent plasma instability. When the instability is sufficiently strong to overcome the losses, stimulated generation of plasmons occurs, providing a plasmon laser. This becomes a source of THz radiation. When the two modes merge, the line shape changes from two separate Lorentzians to a modified Lorentzian, with a characteristic oscillatory feature, which can serve as an *additional* diagnostic marker for the plasma instability. The separation between the positions of the maximum and the minimum of this line shape is a measure of the effective damping rate in the precursor stage, and hence an *in-situ* measure of the inter-subband transition rates. [1] P. Bakshi and K. Kempa, Cond. Matter. Theories., Eds. J.W.Clark and P.V. Panat, Nova Science Publishers, NY, vol. 12, pp 399-412, 1997. [2] P. Bakshi and K. Kempa, Physica E 7, 63, (2000).

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