VOLUME 54, NUMBER 8 PHYSICAL REVIEW LETTERS 25 FEBRUARY 1985

Random-Alloy Splitting of Cu Levels in
GaAs, P

In a recent Letter, Samuelson et al. '

reported new
peaks in the luminescence spectra of Cu-doped
GaAst „P alloys which differ from the single peak
observed for the binary GaAs:Cu. They interpreted
them as due to levels related to the substitutional CuG,
centers with different local environments: They ob-
served in the alloys three peaks that they could corre-
late with the nearest-neighbor configurations sur-
rounding the Cu atoms (i.e., 4As, 3As-lP, 2As-2P).
In this Comment, we compare these data with those
published for excitons bound to substitutional Np
centers in Gai „In„P:N alloys where similar interpre-
tations have previously been given. 2 3 We mention
also a quantitative approach that we presented recent-
ly, 4 which allows us to calculate the energy difference
between localized levels split in an alloy by the dif-
ferent local configurations surrounding the defect
core. We apply this model successfully to the CuG,
centers in GaAsi „P„:Cualloys.
In GaP:N, an isolated nitrogen impurity locally binds an exciton, the radiative recombination of which gives rise to a very narrow luminescence line. When one
adds a small amount of indium to the GaP binary,
three different luminescence bands appear in
Ga& „In„P:N, which are specific to these alloys. 3 By
comparison with GaP:N and GaAst „P„,we attribute them to the recombination of excitons bound to nitro-
gen surrounded by different local configurations: We
proposed that these excitons nitro-