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Clustering Effects in Ga(AsBi)

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Abstract: We present an experiment-theory study of the photoluminescence (PL) from a Ga(AsBi) sample. The temperature-dependence of the experimentally-observed PL peak position shows the so-called "s-shape" typically explained by disorder. Simulations using a kinetic Monte-Carlo algorithm reveal that two disorder scales are necessary to explain the experimental observations. Excellent agreement between simulation and experiment is found using this approach. We interpret these results as an indication of the existence of both cluster and alloy disorder with characteristic energy scales of 11meV and 45meV, respectively.