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Finding probability distributions for electric field gradient components with inhomogeneous broadening in perturbed angular correlation spectroscopy[1] TYLER PARK, MIKE ADAMS, AUSTIN BUNKER, JEFFERY HODGES, MICHAEL STUFFLEBEAM, WILLIAM EVENSON[2], PHIL MATHESON, Utah Valley University, MATTHEW ZACATE, Northern Kentucky University — Materials contain defects, which affect crystal properties such as damping of the correlation signal,$G_2(t)$, in time and broadening of the frequency spectrum in perturbed angular correlation (PAC) experiments. We attribute this inhomogeneous broadening (IHB) to the random static defects that produce a distribution of electric field gradients (EFGs). Our goal is to find a relationship between the amount of broadening and the concentration of defects. After simulating the EFGs from random configurations of defects, we map our results from the V_{zz}-V_{xx} plane to a coordinate system optimized for the EFG distribution through a Czjzek transformation, followed by a conformal mapping. From histograms in this space, we can define probability distribution functions with parameters that vary according to defect concentration. This allows us to calculate the broadened $G_2(t)$ spectrum for any concentration, and, in reverse, identify concentrations given a broadened $G_2(t)$ spectrum.

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