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**Concentration dependence of inhomogeneous broadening in perturbed angular correlation spectroscopy**[1] CARLOS MORENO, JEFFERY A. HODGES, TYLER PARK, MICHAEL STUFFLEBEAM, W. EVENSON, P. MATHESON, Utah Valley University, M.O. ZACATE, Northern Kentucky University — Since real crystals always include defects, the effect of the defects on crystal properties depends on how many defects are present, i.e. on defect concentration. In perturbed angular correlation (PAC), these defects produce damping of the correlation signal in time and broadening of the frequency spectrum. This "inhomogeneous broadening" depends quantitatively on defect concentration, so the size of the broadening in a PAC spectrum can be a measure of the concentration of defects. Using simulated PAC spectra and independent component analysis to obtain the probability distribution function for electric field gradient (EFG) components, we have found defect concentration-dependent parameters for the probability functions. This allows us to calculate broadened PAC spectra for any selected defect concentration. It also allows us to fit defect concentration from an experimental PAC spectrum. This work will be applied initially to broadened PAC data from $\beta$-Mn, Al-doped $\beta$-Mn, and $Sr_2RuO_4$.

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