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**Polar nanoregions and phase instability in relaxors** GUANGYONG XU, Brookhaven National Laboratory, JINSHENG WEN, Brookhaven National Lab/Stonybrook, CHRISTOPHER STOCK, Rutherford Appleton Lab, U.K., PETER GEHRING, NIST — Local polar clusters called polar nano-regions (PNR) are believed to play important roles in the electronic properties of relaxor ferroelectrics. Recent work has shown that the presence of PNRs in relaxor systems could also be related to the high piezoelectric response in these materials. Diffuse scattering studies on PNRs in PMN-xPT and PZN-xPT systems will be presented and their electric field response will be discussed. Our results suggest that there is an intrinsic phase instability in relaxor systems induced by the PNRs, which makes it easier for an (electric field) induced strain to develop. Possible scenarios for the further enhancement of the piezoelectric response near the morphotropic phase boundary (MPB) will also be discussed.

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