Abstract Submitted for the MAR05 Meeting of The American Physical Society

Placzek correction for neutron scattering from condensed matter VALENTIN LEVASHOV, MAXIM LOBANOV, TAKESHI EGAMI, University of Tennessee, South College, Knoxville, TN 37996 and Oak Ridge National Laboratory, Oak Ridge, TN 37831 — In neutron diffraction experiments with condensed matter the energy of the neutrons is comparable to the energy of phonons in the solid. Thus, in the two-axis diffraction measurement of powder, glasses or liquids the structure function determined from scattering intensity, in assumption of completely elastic scattering, can be distorted by inelasticity effects. Correction for inelasticity effects was first proposed by Placzek, by assuming ballistic collision of neutrons with the matter. However, such an assumption is valid only at high momentum transfer and high neutron energies, and in reality the approach developed by Placzek is not accurate enough for solid materials. Here we report on the development of an accurate method, based on multiphonon expansion, for inelasticity correction in solid materials. Then we discuss distortions introduced by inelasticity into pair distribution function.

Valentin Levashov University of Tennessee

Date submitted: 04 Dec 2004 Electronic form version 1.4