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Reciprocal-Space Approach for Atomic Interactions and Configuration Correlations in Highly Inhomogeneous Systems VOLODYMYR BUGAEV, Max-Planck-Institut für Metalforschung, Stuttgart, Germany, ALEXANDER UDYANSKY, Max-Planck-Institut für Eisenforschung GmbH, Düsseldorf, Germany, PETER WOCHNER, Max-Planck-Institut für Metalforschung, Stuttgart, Germany — We have developed a statistical-thermodynamic k-space approach [1], which enables us to unveil local symmetries and mid-range order in highly inhomogeneous, e.g., amorphous metallic and colloidal systems. On the basis of coherent scattering data we extract parameters of interaction potentials, which then are used in calculations of the pair-wise and specifically constructed many-body correlation functions. In particular, the orientational pair-pair correlations describe the structure of mid-range clusters [2]. We will present results of our calculations for model and actual colloidal systems.

[1] V.N. Bugaev, A. Udyansky, O. Shchyglo, H.Reichert, and H. Dosch, Phys. Rev. B 74, 024202 (2006)
[2] P. Wochner, C. Gutt, T. Autenrieth, T. Demmer, V. Bugaev, A.D. Ortiz, A. Duri, F. Zontone, G. Grübel, and H. Dosch, PNAS 106, 11511-11514 (2009).

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