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The Use of Neutron Elastic Scattering for the Investigation of Dynamic Processes in Disordered Systems and Biological Materials. Antonio Deriu, Physics, Univ. of Parma and Infm, Parco Area Delle Scienze, 7/A, Parma, Pr 43100 Italy.

Last generation high resolution spectrometers provide nowadays the possibility of measuring the elastic neutron (ENS) scattering with high accuracy and energy resolution ranging from about 0.3 to 10 μeV . In this way atomic mean square fluctuations that originate from motions in the 100 ps to 5 ns time scale can be investigated as a function of sample thermodynamic parameters (temperature, pressure, hydration, ...). This technique has proven to be particularly effective in studying the dynamics of a variety of condensed matter systems from disordered and amorphous solids to polymers and biological materials elucidating for instance common dynamic features of these systems as the existence of "glass-like" kinetic transitions due to the onset on new degrees of freedom that are activated upon temperature raising from the cryogenic ones to room temperature. In the case of biological materials, the presence of a large number of hydrogen atoms (about 50 % of the total), makes incoherent elastic scattering an ideal tool to get information on the mean macromolecular dynamics and can then contribute to better elucidate the relation between structure, dynamics and biological function. Some selected examples of applications of ENS to studying the dynamics of soft matter systems will be illustrated and discussed.