The structure of liquids and amorphous solids are characterised by pair correlation functions where the number of chemically distinct species. A single diffraction pattern contains an average over all the pair correlation functions whereas it is clear from a number of studies that critical tests of theory require knowledge of the individual pair correlation functions. The most successful method yet devised to extract these partial correlation functions is neutron diffraction combined with isotopic substitution. The technique will be illustrated by reference to recent studies on aqueous solutions, molten salts and liquid semiconductors. The characteristic short range order of each of these liquid types will be discussed and reference will be made to current theoretical developments.

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