Interplay of periodicity and aperiodicity for thephysical properties of aperiodic crystals.

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Incommensurate composites may have subsystems for which the basic structure even is aperiodic. Examples are composition flexible composites. The other subsystems may have periodic basic structures. One of the distinctions between the two is the character of vibrational excitations and of elctrons. In periodic subsystems they are in first approximation extended, whereas in the aperiodic subsystems they tend to be localised or critical.
In a class of quasicrystals it is also possible to distinguish subsystems with a different character of the phonons and electrons.
The mutual interaction between the subsystems may be considered to be responsible for a number of peculiar properties of the systems mentioned before. This will be illustrated on a simple model, the double chain model, with electrons and phonons. Among the special properties is the occurrence of a pseudo-gap in the density of states (VDOD or EDOS).