

Z-module defects in intermetallic alloys

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We analyze what kind of new defects could appear in crystalline structures where the positions of the atoms and the unit cell belong to a same Z-module, i. e. are irrationnal projections of a $N > 3$ dim (N-D) lattice Λ as in the case of quasicrystals. Beyond coherent irrationally oriented twins already discussed in a previous paper (M. Quiquandon et al. 2016), new 2D translational defects are expected, the translation vectors of which, being projections of nodes of Λ , have irrational coordinates with respect to the unit cell reference frame. Partial dislocations, called here module dislocations, are the linear defects bounding these translation faults. A specific case arises when the Burgers vector \vec{B} is the projection of a non-zero vector of Λ that is perpendicular to the physical space. We call this new kind of dislocation a scalar dislocation since, because its Burgers vector in physical space is zero, it generates no displacement field and has no interaction with external stress fields and others dislocations.

Quiquandon M, Gratias.D, Sirindil.A, Portier. R (2016). Acta Cryst. A 72, 55-61

Schechtman.D, Belch.I, Gratias.D, Cahn.J.W. Phys.Rev.Lett,53, 1951-1954

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