

Fracture Mechanics of Quasicrystalline Materials

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Abstract The existence of phason field - the unusual field parameter - in quasicrystals leads to the essential difference of the elasticity between the materials with the conventional structural materials including crystals. In the new solid phase there are two different displacement vectors phonon and phason fields. Connecting with this there are two different strain tensors and stress tensors in the new material. This challenges the solid mechanics as well as the fracture mechanics of conventional structural materials. In this paper some exact solutions for crack problems under different configurations and states of motion in different quasicrystal systems will be exhibited, these results reveal the characteristics of fracture mechanics of the new material. In which the correlation and difference feature of the new branch with the traditional fracture mechanics are demonstrated.