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Interaction between a screw dislocation and a circular nano-inhomogeneity with a bimaterial interface

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Highlights

- Study the interaction between a dislocation and a circular nano-inclusion with a bimaterial interface
- The stability of the dislocation in three-phase system consisting of nano-inclusion, Material 2 and Material 3.
- Material elastic dissimilarity, the radius of the inclusion, the distance from the inclusion's center to the bimaterial interface, and surface/interface stress between the inclusion and the matrix for the elastic interference of the screw dislocation and the nano-inhomogeneity are discussed in detail.
- When the inclusion and the Material 3 are both harder than the matrix ($\mu_1 > \mu_2$ and $\mu_3 > \mu_2$), a new stable equilibrium position for the screw dislocation in the matrix appears near the bimaterial interface, when the inclusion and the Material 3 are both softer than the matrix ($\mu_1 < \mu_2$ and $\mu_3 < \mu_2$), a new unstable equilibrium position exists close to the bimaterial interface.

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