Seminar über Fragen der Mechanik

zu folgendem Vortrag wird herzlich eingeladen

Montag, 22.10.2012, 14:15 Uhr, Egerlandstr. 5, Raum 0.044

Non-singular Dislocations in the Theory of Gradient Elasticity

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The fundamental problem of non-singular dislocations in the framework of the theory of gradient elasticity will be presented in this talk. A general theory of non-singular dislocations is developed for linearly elastic, infinitely extended, homogeneous, and isotropic media. Dislocation loops and straight dislocations are investigated.

Using the theory of gradient elasticity, the non-singular fields which are produced by arbitrary dislocation loops are given. 'Modified' Mura, Peach-Koehler, and Burgers formulae are presented in the framework of gradient elasticity theory. These formulae are given in terms of an elementary function, which regularizes the classical expressions, obtained from the Green tensor of the Helmholtz-Navier equation.

Using the mathematical method of Green's functions and the Fourier transform, exact, analytical, and non-singular solutions were found. The obtained dislocation fields are non-singular due to the regularization of the classical singular fields.

References:

[1] M. Lazar and G.A. Maugin, Nonsingular stress and strain fields of dislocations and disclinations in first strain gradient elasticity, Int. J. Engng. Sci. 43 (2005) 1157-1184
[2] M. Lazar, Non-singular dislocation loops in gradient elasticity, Phys. Lett. A 376 (2012) 1757-1758
[3] M. Lazar, The fundamentals of non-singular dislocations in the theory of gradient elasticity: dislocation loops and straight dislocations, Int. J. Solids Struct. (2012), doi:10.1016/j.ijsolstr.2012.09.017

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