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Università degli Studi di Pavia
Computational Mechanics & Advanced Materials Group - DICAr

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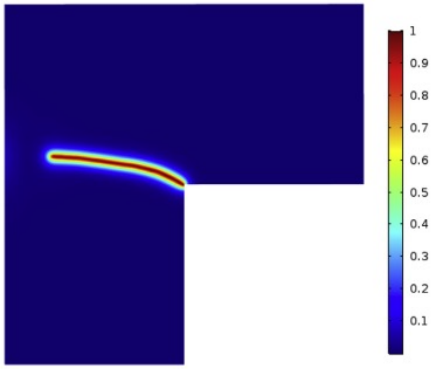
Virtual Modeling and Additive Manufacturing for Advanced Materials

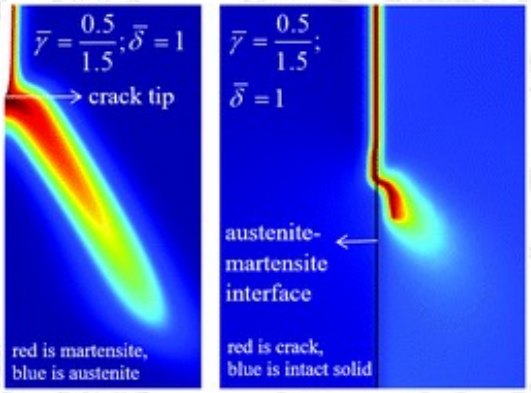
SEMINAR

Phase field approach to fracture, phase transformation and coupling between fracture and phase transformation



Phase field approach is discussed and applied for fracture. The importance of analysis of the thermodynamic potential in terms of stress-strain curves is shown. It is shown how a phase field theory can describe a broad spectrum of the shapes of stress-strain relationships.

Then, the phase field theory for martensitic phase transformation is developed and coupled with the current phase field theory of fracture.



The coupled model includes change in surface energy during phase transformation and the effect of unexplored scale parameter proportional to the ratio of the widths of the crack surface and the phase interface. Variation of these two parameters causes unexpected qualitative and quantitative effects: shift of phase transformation away from the crack tip, “wetting” of the crack surface by martensite, change in the structure and geometry of the transformed region, crack trajectory, and process of interfacial damage evolution, as well as transformation toughening. The results suggest additional parameters controlling coupled fracture and phase transformations.

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May 5th, 4:00pm (sharp)
https://us02web.zoom.us/j/85801258601