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Statistical Aspects of Fracture

L. Ponson[1], D. Bonamy[2], J.-F. Molinari[3]

[1]Université Pierre & Marie Curie, Paris (FRANCE) (laurent.ponson@upmc.fr)

[2]CEA Saclay, (FRANCE) (daniel.bonamy@cea.fr)

[3]EPFL Lausanne (SWITZERLAND) (jean-francois.molinari@epfl.ch)

This minisymposium focuses on the statistical aspects inherent to fracture, their implications in terms of predictability and representativeness, the experimental/analysis methods to characterize them, the theoretical & numerical upscaling methods developed to take them into account … The past twenty years have seen the emergence of novel approaches, at the interface between non-linear continuum mechanics and statistical and non-linear physics. It is timely to discuss these recent advances. Applications of this research to material characterization, failure analysis and structural health monitoring are also most welcome. Key topics will include:

1. Predictability in brittle fracture: Statistics of failure strength, material defect characterization, crack initiation, size effects.
2. Statistical characterization of patterns and shapes in fracture: crack trajectory, morphology of fracture surfaces, fragmentation, crack networks.
3. Intermittency, crackling and universal features: acoustic emission, stick-slip dynamics of cracks, crack pinning, earthquake statistics.
4. Statistical approaches in damage mechanics: quasi-brittle materials, compressive and shear failure, localization.
5. Scale coupling and emergence of effective failure properties: Theoretical and numerical methods to address multiscale processes, homogenization techniques, stochastics approaches.
6. Statistical tools for engineering applications: Structural health monitoring, acoustic emission techniques, risk assessment, quantitative fractography, failure analysis.

Numerical, theoretical and experimental studies are welcome and encouraged.