Abstract Submitted
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Towards an improved physical understanding of dynamic plasticity in FCC metals[1] LEWIS LEA, ANDREW JARDINE, Univ of Cambridge — Above true strain rates of 10^4 s^{-1}, FCC metals begin to exhibit a rapid increase in strength. Attempts at modelling this transition have led to two general theories as to the underlying mechanisms. Firstly, the drift velocity of the dislocations imparting strain has been proposed to become limited by viscous-like scattering with phonons in the metal. Meanwhile, other authors have proposed that the ever reducing timescale of slip gives rise to changes in the evolution of dislocation structure. Regardless of the chosen mathematical framework, the fundamental natures of the two proposed mechanisms provide testable qualitative predictions about material behaviour. In this study we will perform a variety of Hopkinson bar experiments on a OFHC grade copper to provide insight into which of these two mechanisms provides the most sound basis for developing reliable models of high rate metal plasticity.

[1]EPSRC

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