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Discontinuous Buckling LUUK LUBBERS, CORENTIN COULAIS, Universiteit Leiden, JOHANNES OVERVELDE, KATIA BERTOLDI, Harvard University, MARTIN VAN HECKE, Universiteit Leiden — Buckling of beams under uniaxial loading is perhaps the most basic example of an elastic instability. In this talk we show that sufficiently wide beams exhibit discontinuous buckling, an unstable form of buckling where the post-buckling stiffness is negative. We develop a 1D model that matches our experimental and numerical data and identify nonlinearity as the main cause for negative stiffness. We then utilize this non-linearity to create metamaterials that allow us to rationally design the (negative) post-buckling stiffness of metabeams, independently of beam thickness, thereby making it possible to violate Euler's limit for slender beam buckling.

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