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Coalescence of Fluid-Driven Fractures NIALL O'KEEFFE, ZHONG ZHENG, HERBERT HUPPERT, PAUL LINDEN, DAMTP, University of Cambridge — We present an experimental study on the coalescence of two in-plane fluid-driven penny-shaped fractures in a brittle elastic medium. Initially, two fluid-driven fractures propagate independently of each other in the same plane. Then when the radial extent of each fracture reaches a certain distance the fractures begin to interact and coalesce. This coalescence forms a bridge between the fractures and then, in an intermediate period following the contact of the two fractures, most growth is observed to focus along this bridge, perpendicular to the line connecting the injection sources. We analyse the growth and shape of this bridge at various stages after coalescence and the transitions between different stages of growth. We also investigate the influence of the injection rate, the distance between two injection points, the viscosity of the fluid and the Young's modulus of the elastic medium on the coalescence of the fractures.

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