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The role of air in granular jet formation DEVARAJ VAN DER MEER, RAYMOND BERGMANN, GABRIEL CABALLERO, DETLEF LOHSE, University of Twente, The Netherlands — A steel ball impacting on a bed of very loose, fine sand results in a surprisingly vigorous jet which shoots out from the surface of the sand. When the ambient pressure is reduced, the jet is found to be less vigorous, which suggests that air should play an important role in the mechanism of jet formation. In our impact experiments it was found that the penetration depth of the ball strongly decreases with decreasing pressure, whereas all other results are consistent with the gravitational collapse of the cavity that is created upon impact. This limits the influence of air to the stage of void formation, in which the cavity is created by a balance of the initial potential energy of the sphere and the dissipation due to the drag the ball experiences when penetrating into the sand.

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