Abstract Submitted for the DFD06 Meeting of The American Physical Society

Localisation of mushy-layer convection by background flow<sup>1</sup> STEVEN ROPER, STEPHEN DAVIS, PETER VOORHEES, Northwestern University — Under certain conditions, the directional solidification of a binary alloy leads to the development of a dendritic mushy region. Convective instability in the mush initiates the formation of chimneys (freckles). We examine the rôle of a weak and slowly varying background flow in the localisation of mushy-layer convection. Both two and three dimensional perturbations to a two dimensional background flow are considered in the near-eutectic limit, where the solid fraction in the mush is small. We find that three-dimensional disturbances are localised at places where there is upflow in the mush. We present amplitude equations to describe the evolution of both the 2D and 3D disturbances.

<sup>1</sup>Funded by MEANS II AFOSR grant #FA9550-05-1-0089.

Steven Roper Northwestern University

Date submitted: 04 Aug 2006

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