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Gamma-ray Bursts in Inhomogeneous Interstellar Media JACOB
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oratory, MATTHEW ANDERSON, Idaho National Laboratory — Gamma-ray
bursts (GRBs) are among the most luminous electromagnetic phenomena in the
known universe, but there is still much unknown about them. In particular, their
circumstellar environments are likely much more complicated than a simple massive-
star wind-density profile, as is commonly assumed. Long GRBs show late time flares
in their optical and X-ray light curves that may be a reflection of this rich environ-
ment. Using relativistic hydrodynamics simulations, we study a family of initial
data with a relativistic blast wave encountering a dense circumstellar shell of mat-
ter, similar to what might be generated by an aging star expelling the outer layers of
its atmosphere. We test the possibility that some of the late time curve variability
may result from these interactions and characterize the profiles of the reverse shocks.

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