



Failure is Fundamental

Gaia Righi

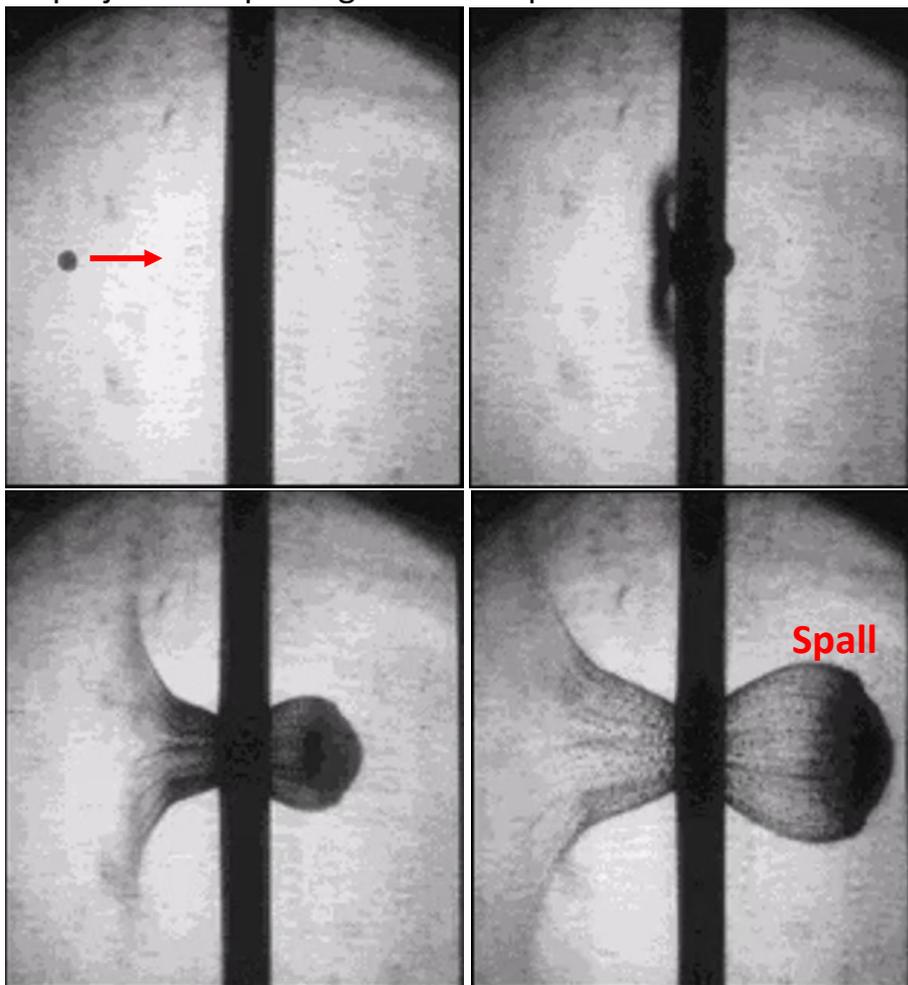
Weapons & Complex Integration/HEDP Summer Program
Hye-Sook Park, Robert Rudd, Tom Lockard, Nathan Barton
Marc Meyers (UC San Diego)



Impacts lead to dramatic spallation that depends on fundamental material properties.

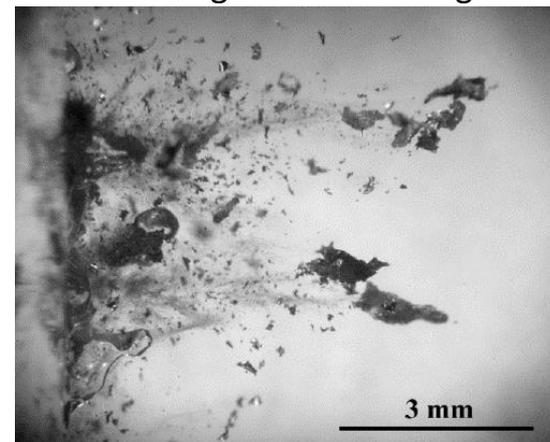


Al projectile impacting aluminum plate

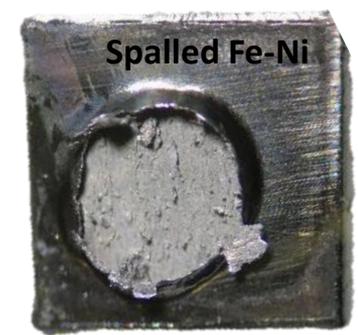


nasa.gov

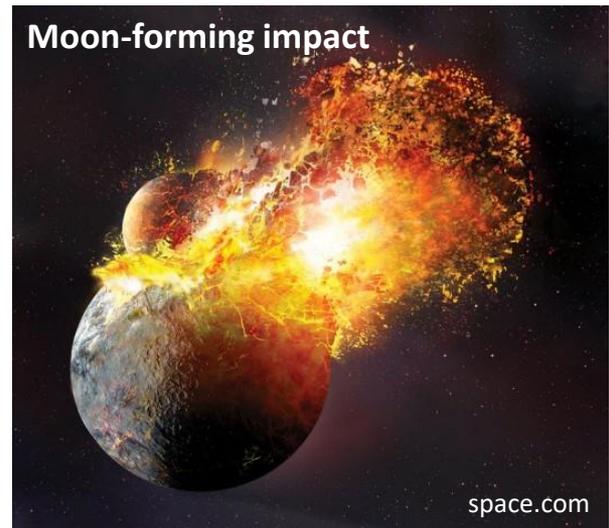
Fe fragments following laser-shock induced spall



De Resseguier et al., Metals 4 (2014)

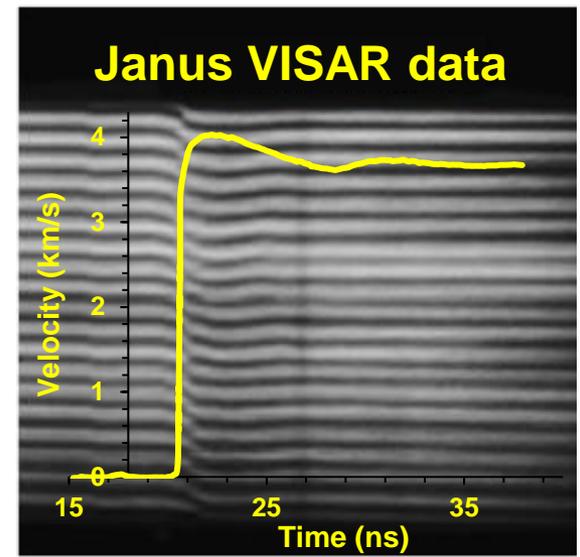
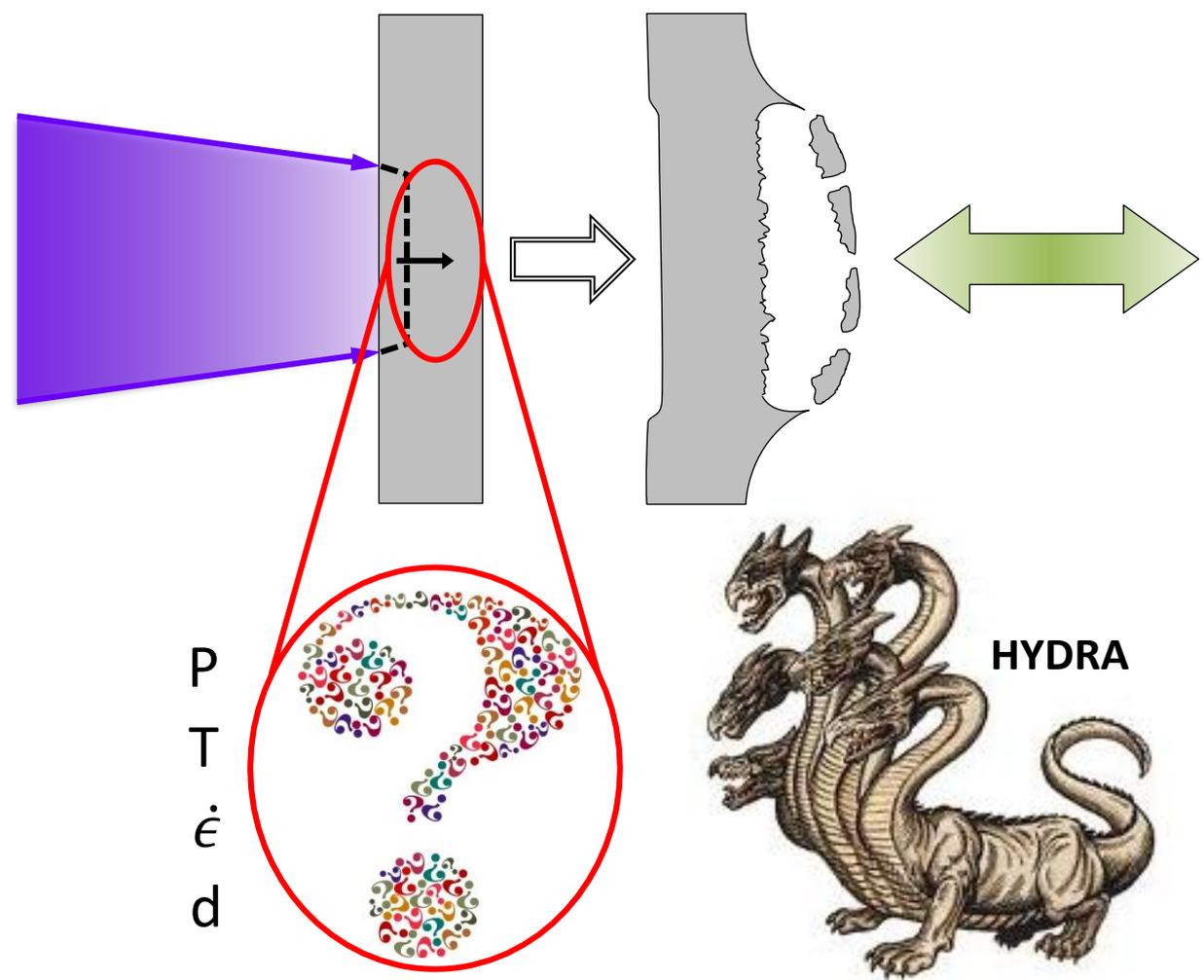


Righi, G. in prep.



space.com

Simulations provide insight where experiments cannot measure directly.



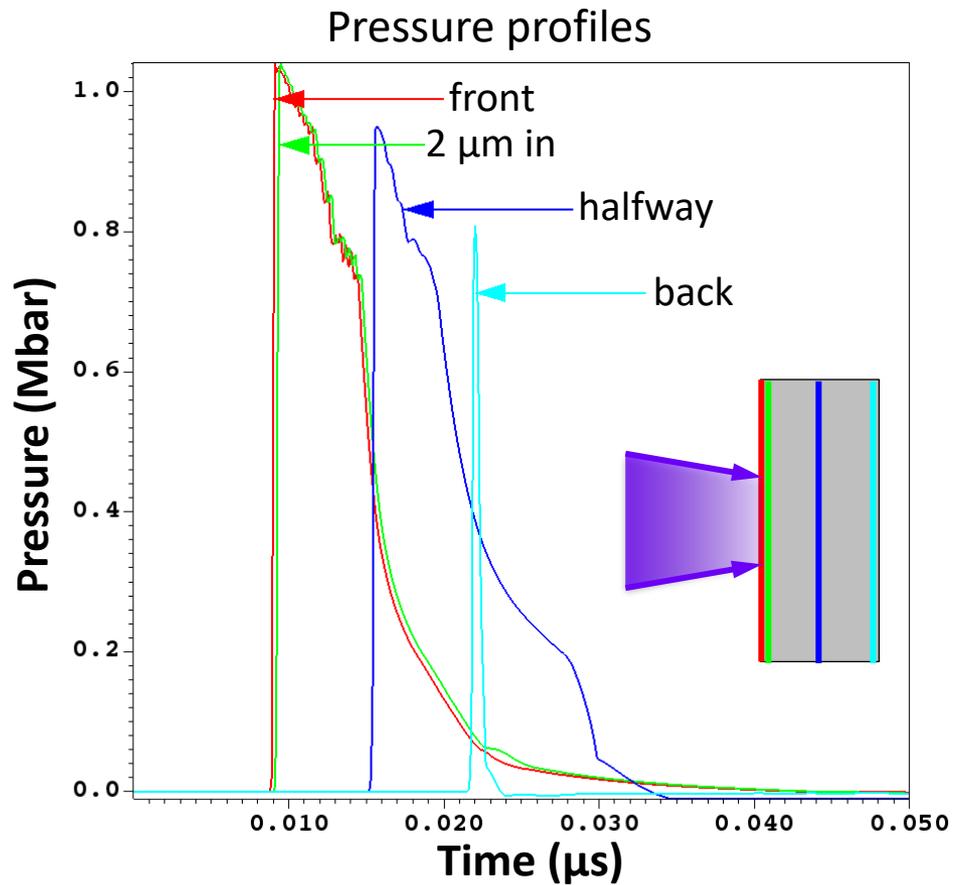
P
T
ε̇
d

HYDRA

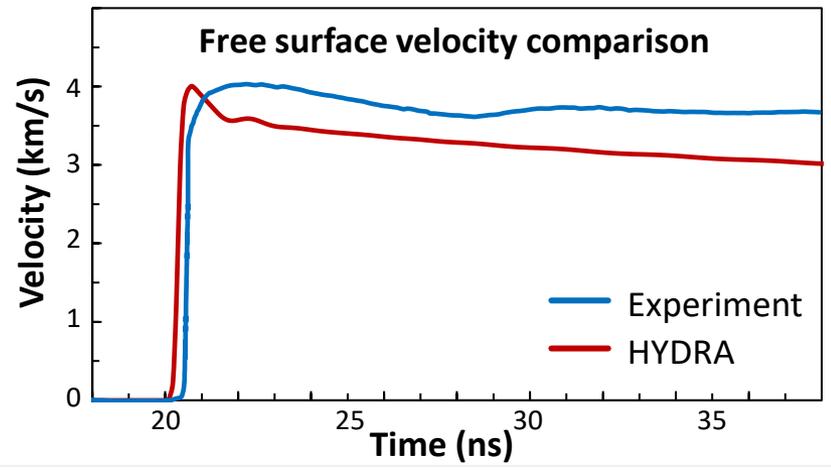
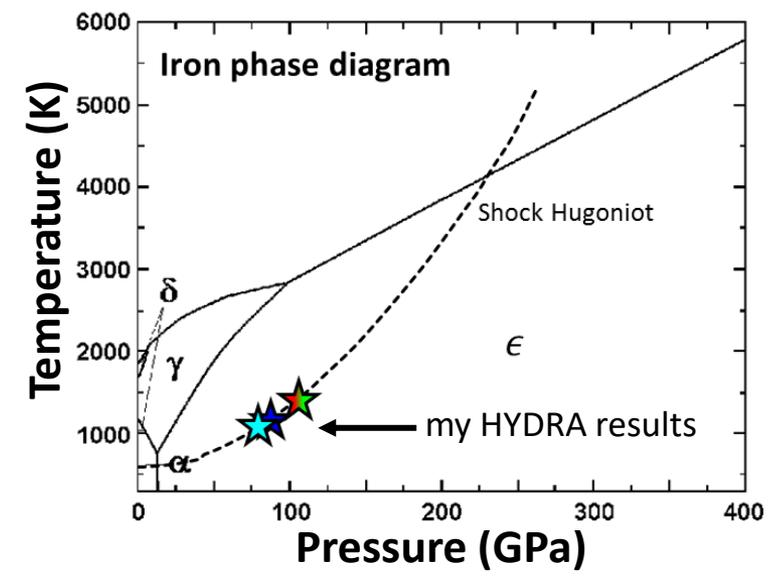
$$\sigma_{sp} = f(Z, s, \dot{\epsilon}, T)$$

$$\sigma_{sp} = \sigma_0 \dot{\epsilon}^m$$

Dynamic conditions are better understood, and now into spall behavior...



- HYDRA predicts peak pressure of 1 Mbar
- Simple spall model causes discrepancy in U_{fs}





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