Avalanches in Foam Collapse

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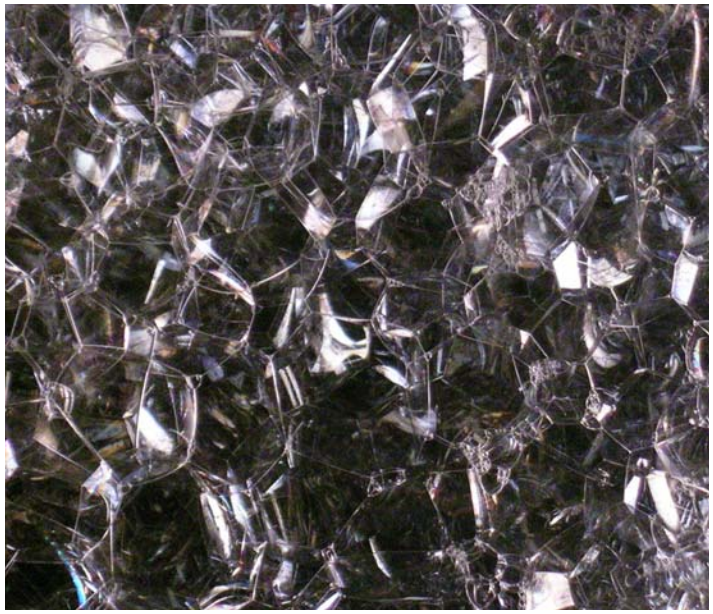
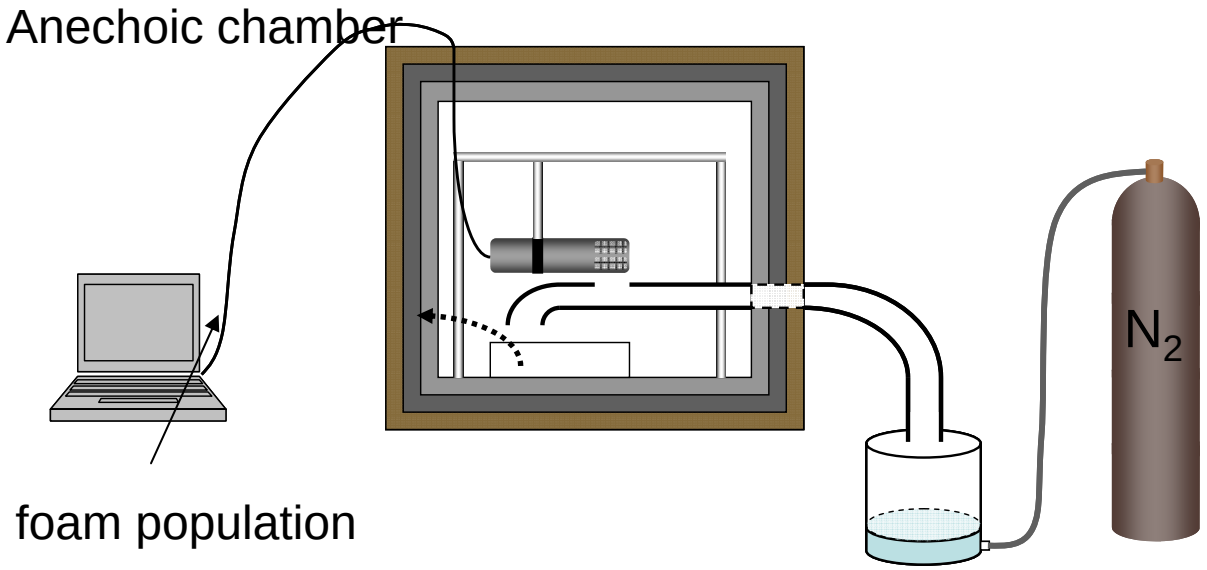
Avalanches

- Question: What causes foam to collapse in avalanches?

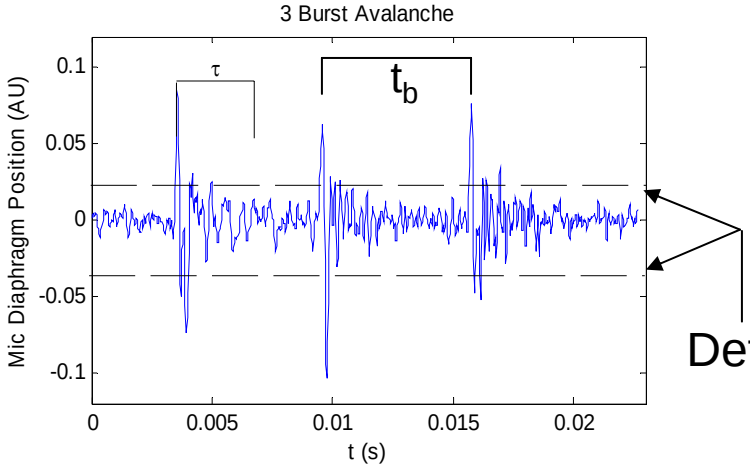
- Two possibilities
  - Shockwaves
  - Stresses formed by topological rearrangement



Experimental Setup



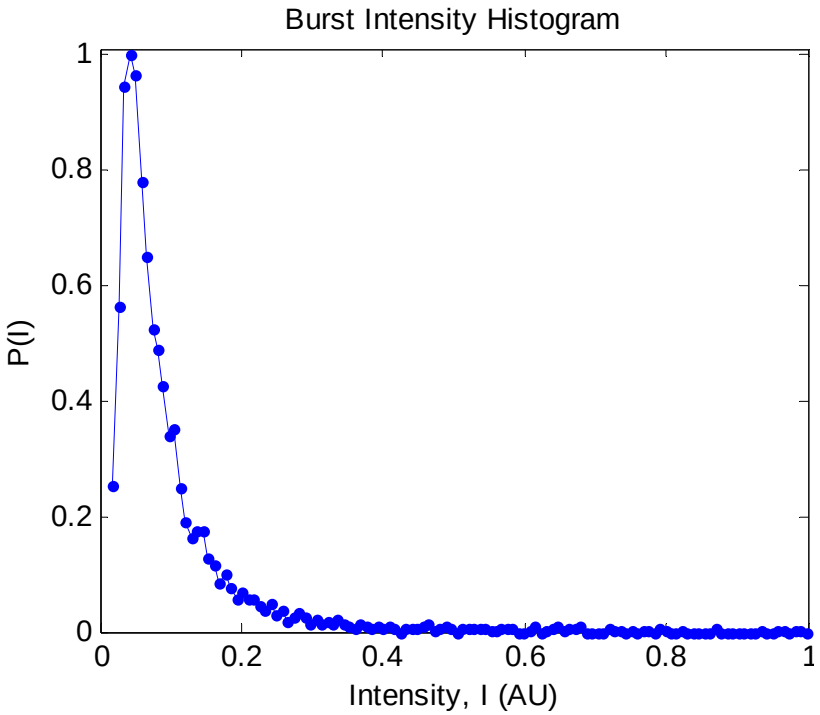
‘Steady state’ foam population

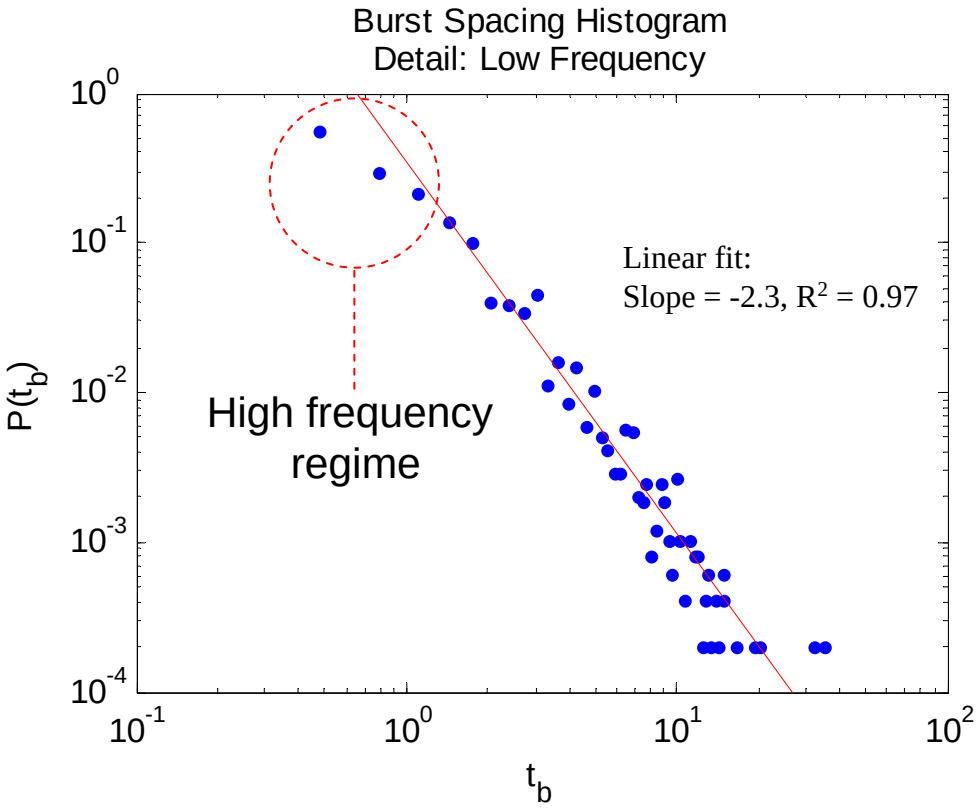


$$I = \int_t^{t+\tau} f(t)^2 dt.$$

Detection threshold

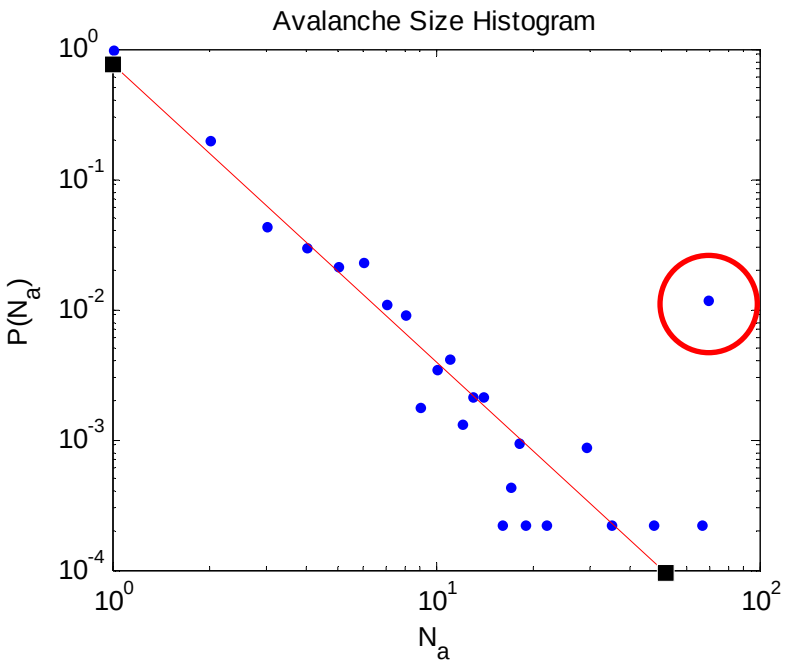
Results – Intensity & Frequency

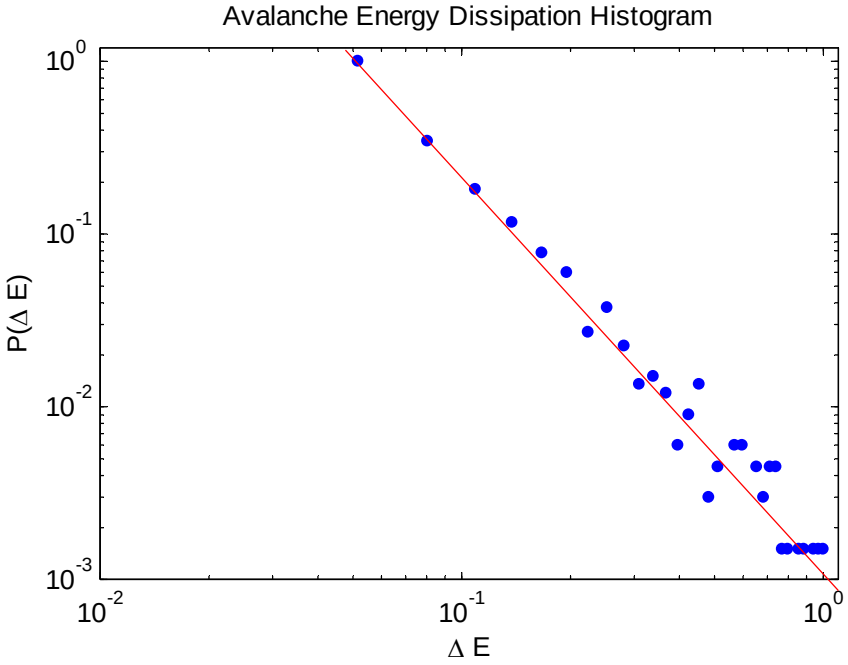




t_b – spacing between bursts (s)

Results – Avalanche Size

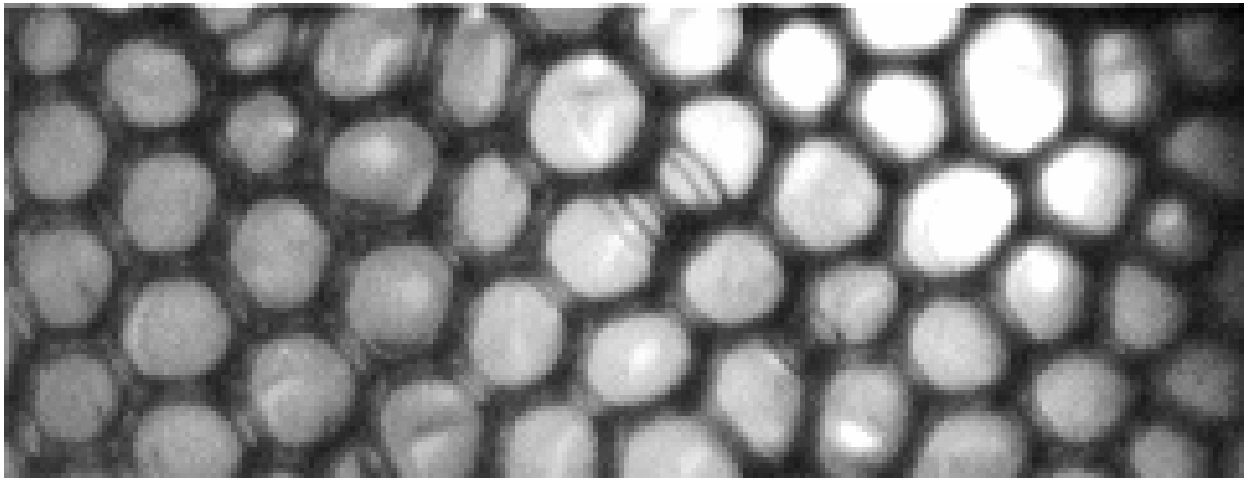




N_a – number of events per avalanche

Results – High Speed Video

- 2000 fps video reveals characteristics of shockwaves.
  - Bursts eject liquid droplets, but with small velocity.
  - Rarely causes neighboring cell rupture.



Conclusions

- Avalanches are initiated by stresses resulting from topological rearrangement.
- Shockwaves not sufficient for initiation.