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**Spatio-temporal dynamics of brittle fracture in particle rafts**
ARYESH MUKHERJEE, MAHESH BANDI, OIST Graduate University — Brittle solids fracture at tremendous speeds, making it difficult to experimentally analyse their spatial and temporal dynamics. Both these challenges can be circumvented with macroscopic analog models, such as heterogeneous, irregular glass spheres floating at the air-water interface (particle rafts). Different structural constants can be set up by varying the initial packing fraction. Fracture is initiated by a surfactant drop introduced at the center of the petri dish; the spreading drop applies compressive and tensile stresses on the rafts, causing it to fracture. High speed imaging shows that the crack area and length do not proceed as previously predicted, and is sensitive to the initial packing fraction. Tracking individual raft particles as the cracking proceeds reveals three distinct stages. First, a fast compressive wave passes through the solid followed by a slower compaction wave that causes global anisotropic rearrangements. At this stage, the radial component of the instantaneous strain field proceeds circularly and symmetrically whereas the azimuthal component shows spiral patterns. Finally, the compaction recedes and thin cracks appear that travel intermittently and show long range correlated movement through the solid.

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