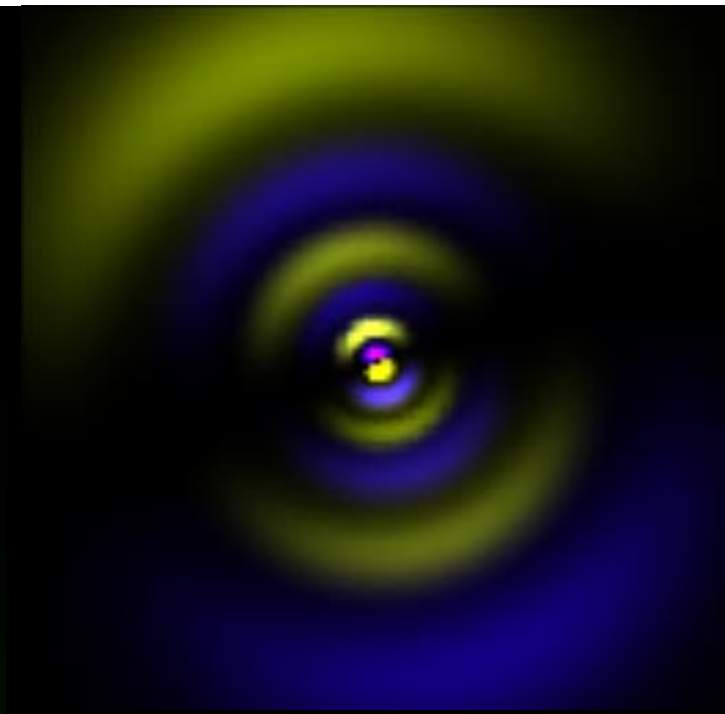
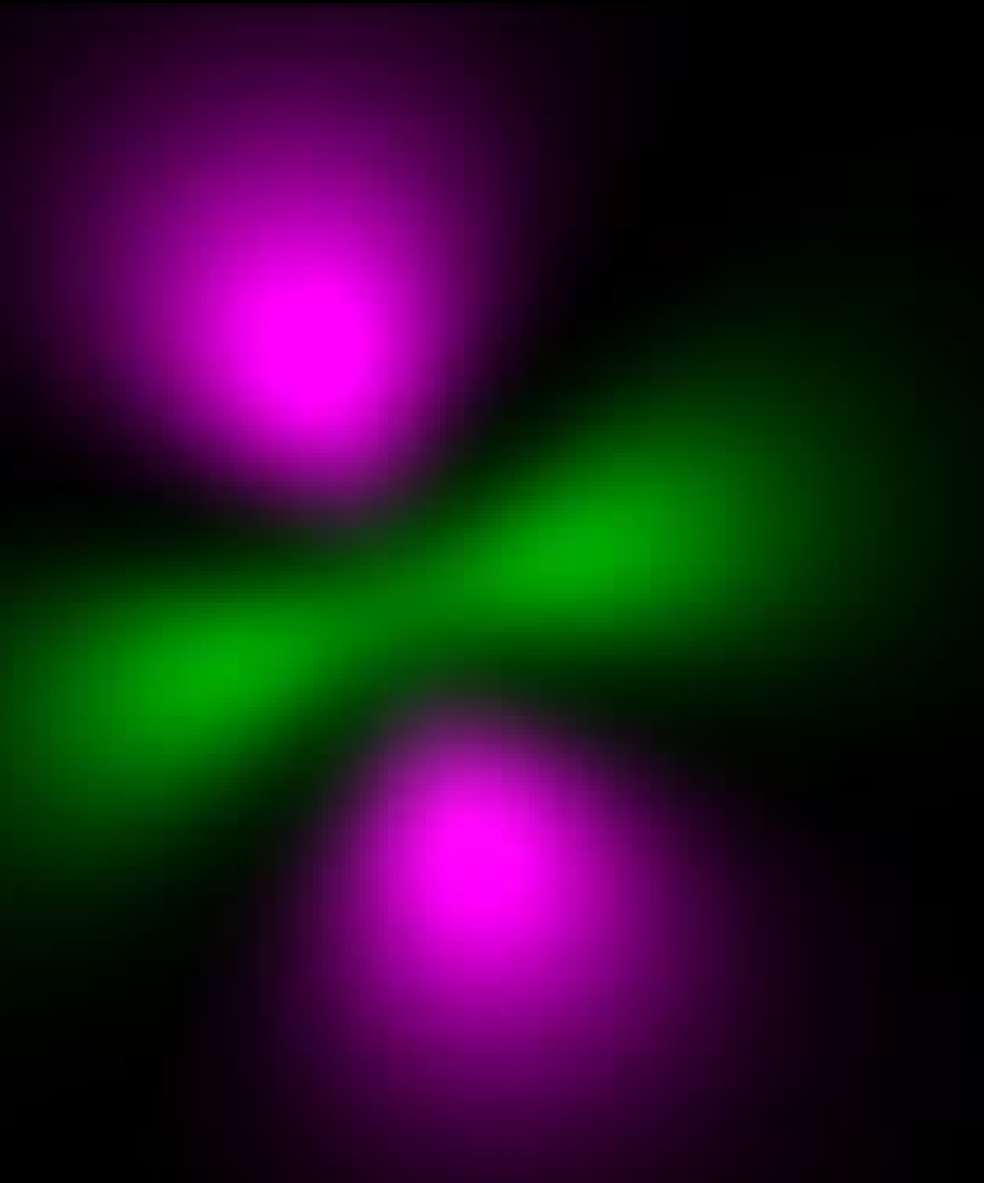
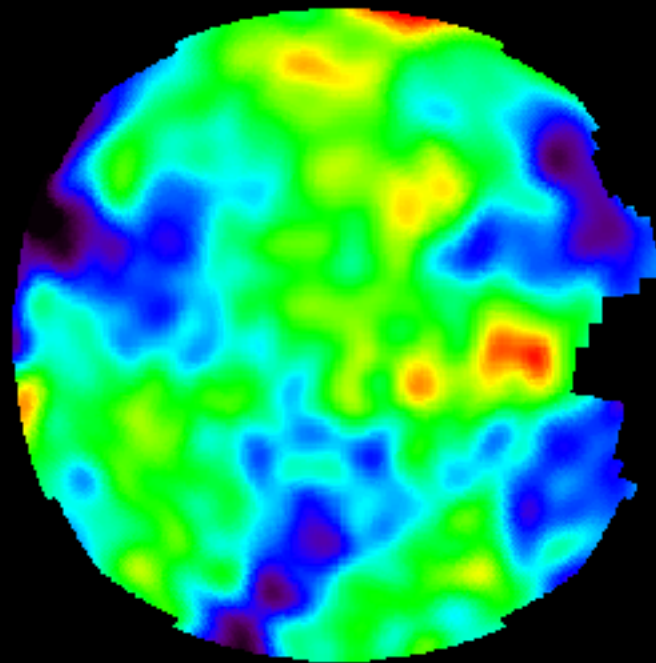
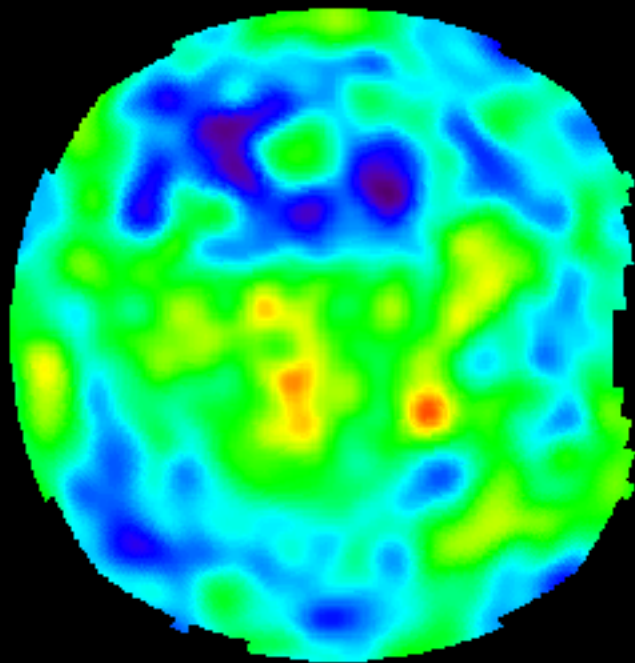


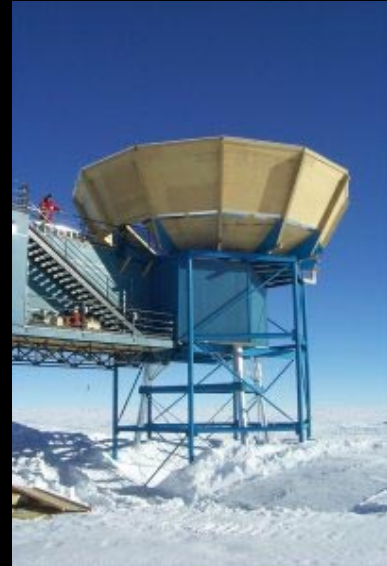
atoms



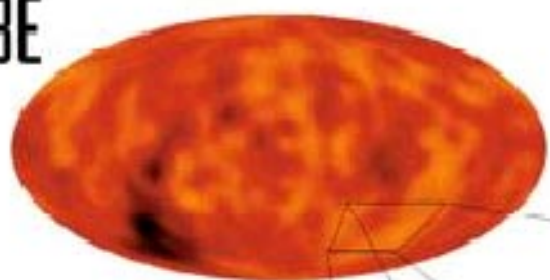
# Sky



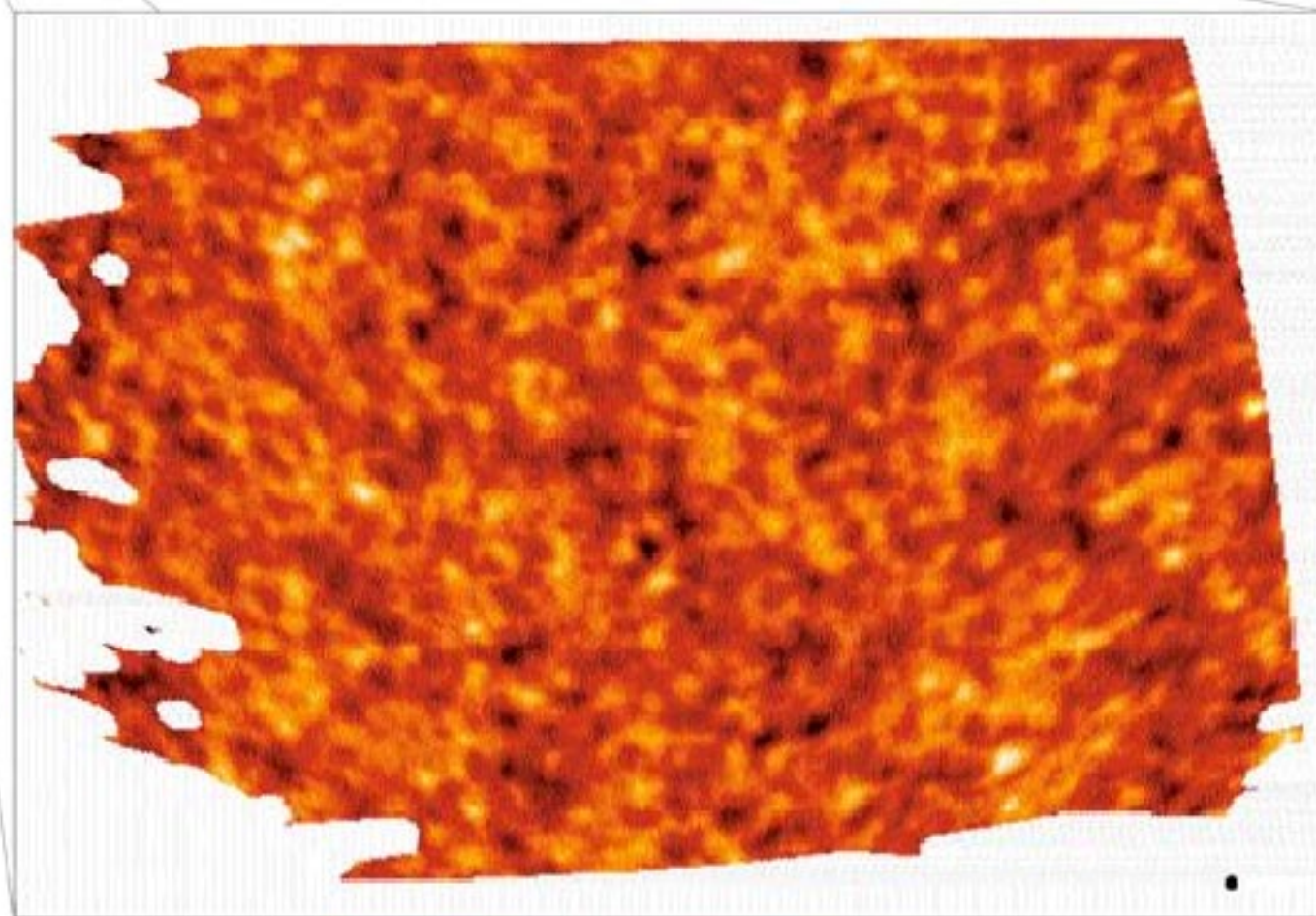


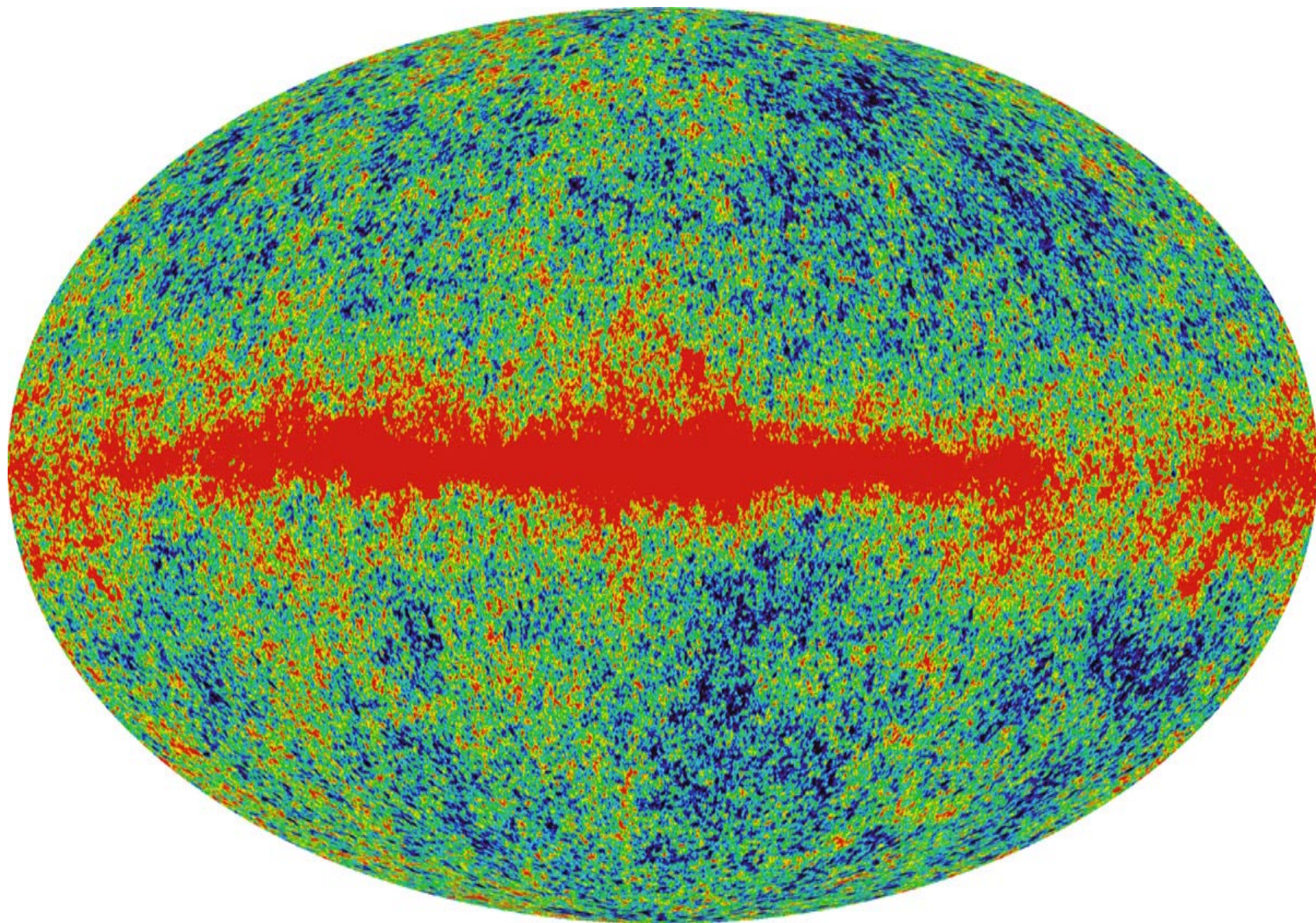


DBE



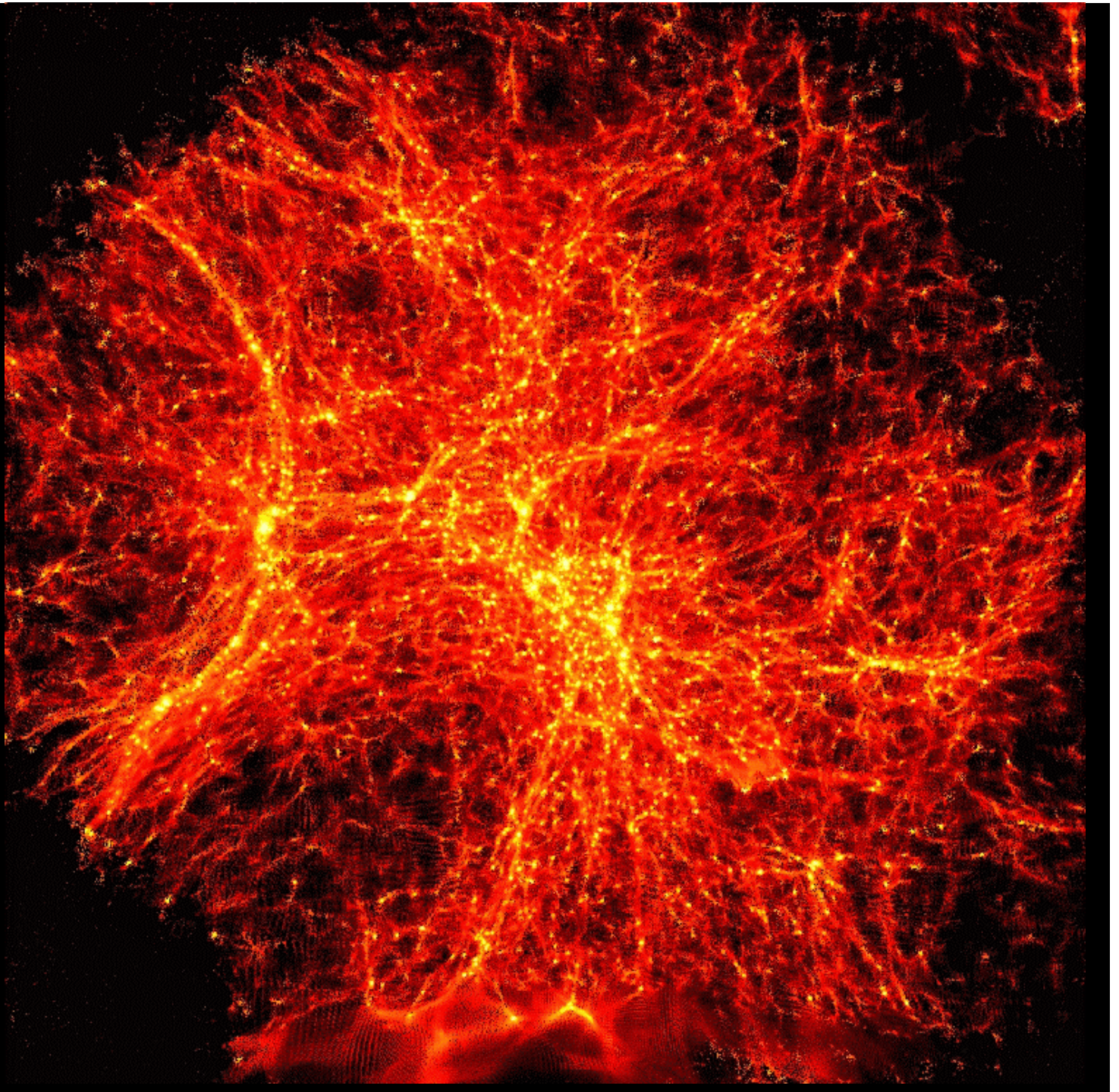
Boomerang



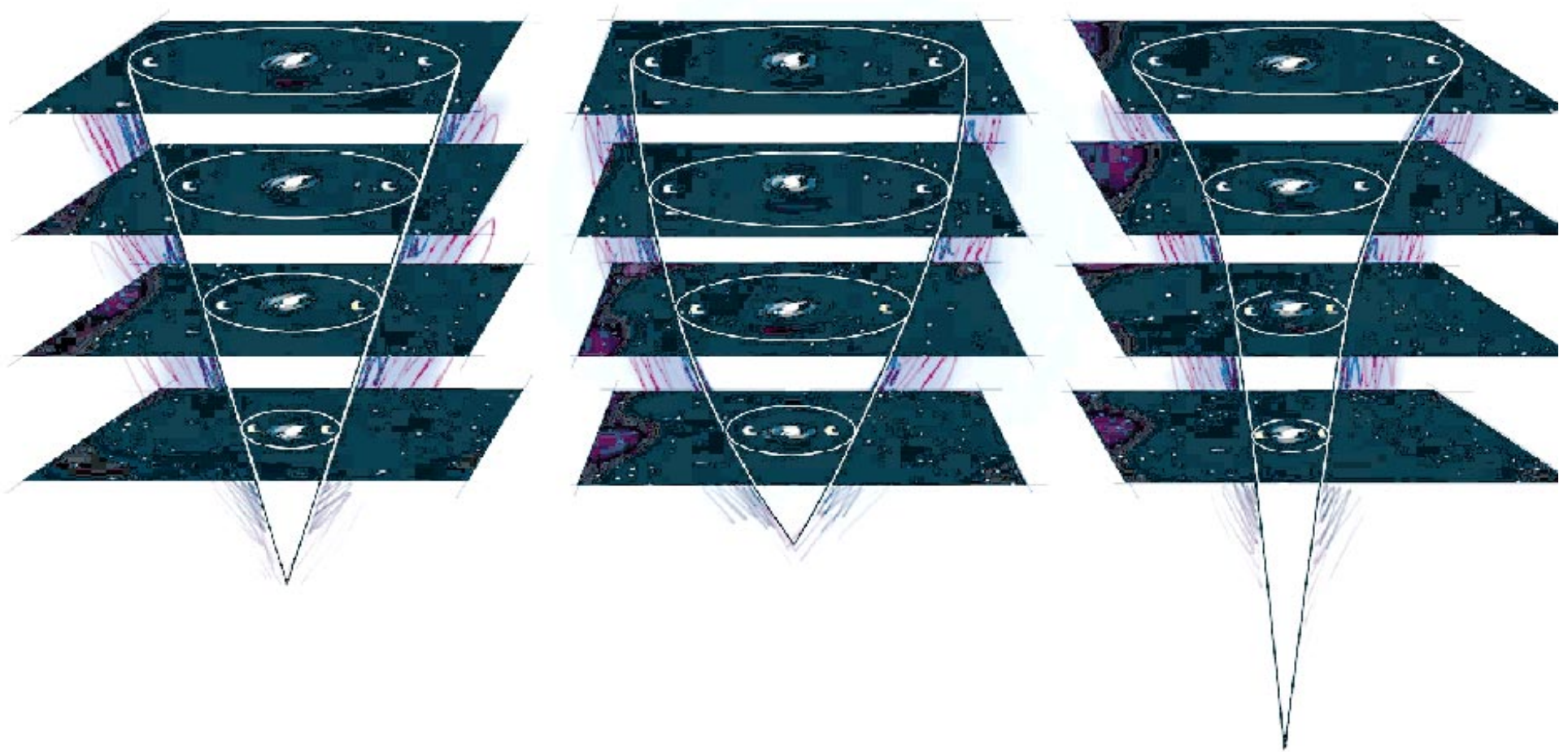


web

UW Nbody Group



What kind of spacetime is our universe?  
coasting    decelerating    accelerating



Depends on the nature of mass-energy





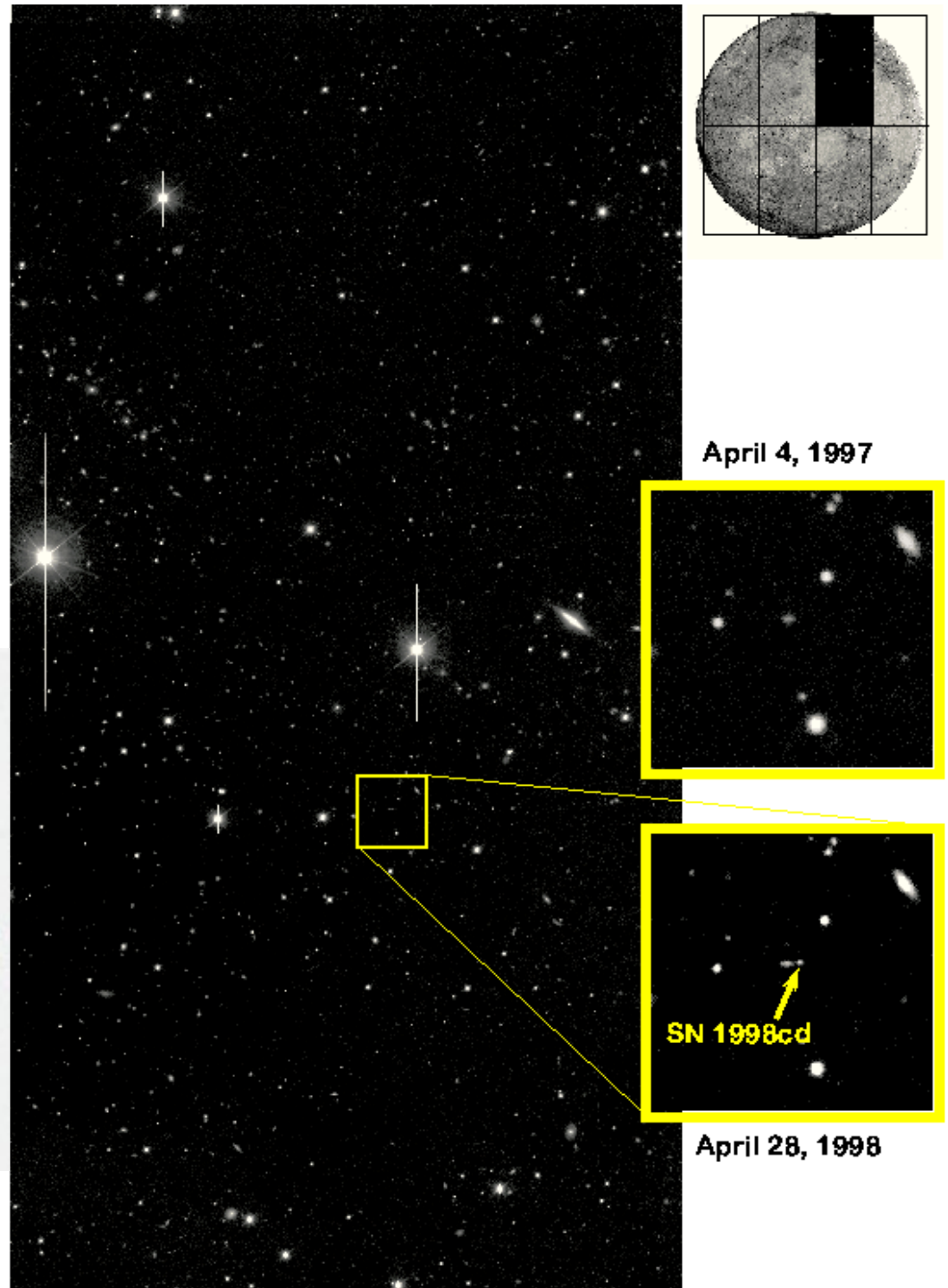
Type Ia  
supernova

# new ancient supernova

**The High-Z SN Search**



Measuring the Cosmic Deceleration  
and Global Geometry  
of the Universe  
with Type Ia Supernovae

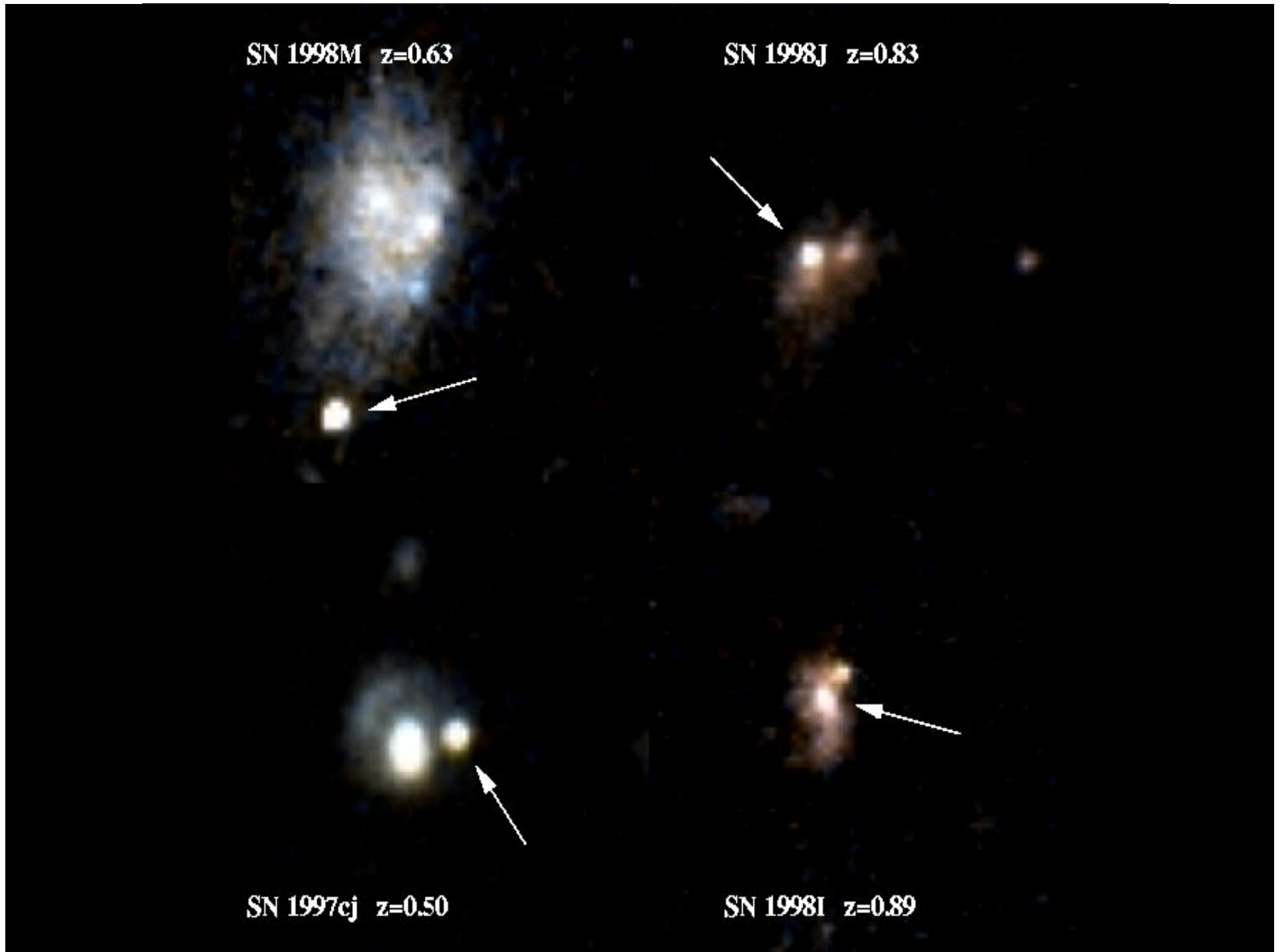


SN 1998M  $z=0.63$

SN 1998J  $z=0.83$

SN 1997cj  $z=0.50$

SN 1998I  $z=0.89$



# fading supernova viewed with HST



# Nambu-Goldstone displacement modes

Broken Poincare symmetry during condensation of a brane: random displacements in the higher dimensions lead to intrinsic curvature

These are dynamically converted into tensor modes close to maximal amplitude up to Hubble frequency, suppressed at low frequencies

space

