CURVATURE-INDUCED CLUSTERING ON CURVED MANIFOLDS

100%

Clustering at e=0.9

$\tau = 15$s

Formation time

r = +0.89

Density-curvature correlation

KEY DISCOVERIES:

1. Particles form TWO CLUSTERS at ellipse poles (high curvature regions)
2. Density profile: $\rho(\varphi) \propto \kappa(\varphi)$ — particles accumulate where curvature is highest
3. Higher temperature promotes MORE clustering (counter-intuitive!)
4. This is a NON-EQUILIBRIUM phenomenon driven by collision dynamics

Key Result : $\rho(\phi) \propto \kappa(\phi)^{2/3} \propto 1/\sqrt{g_{\phi\phi}(\phi)}$