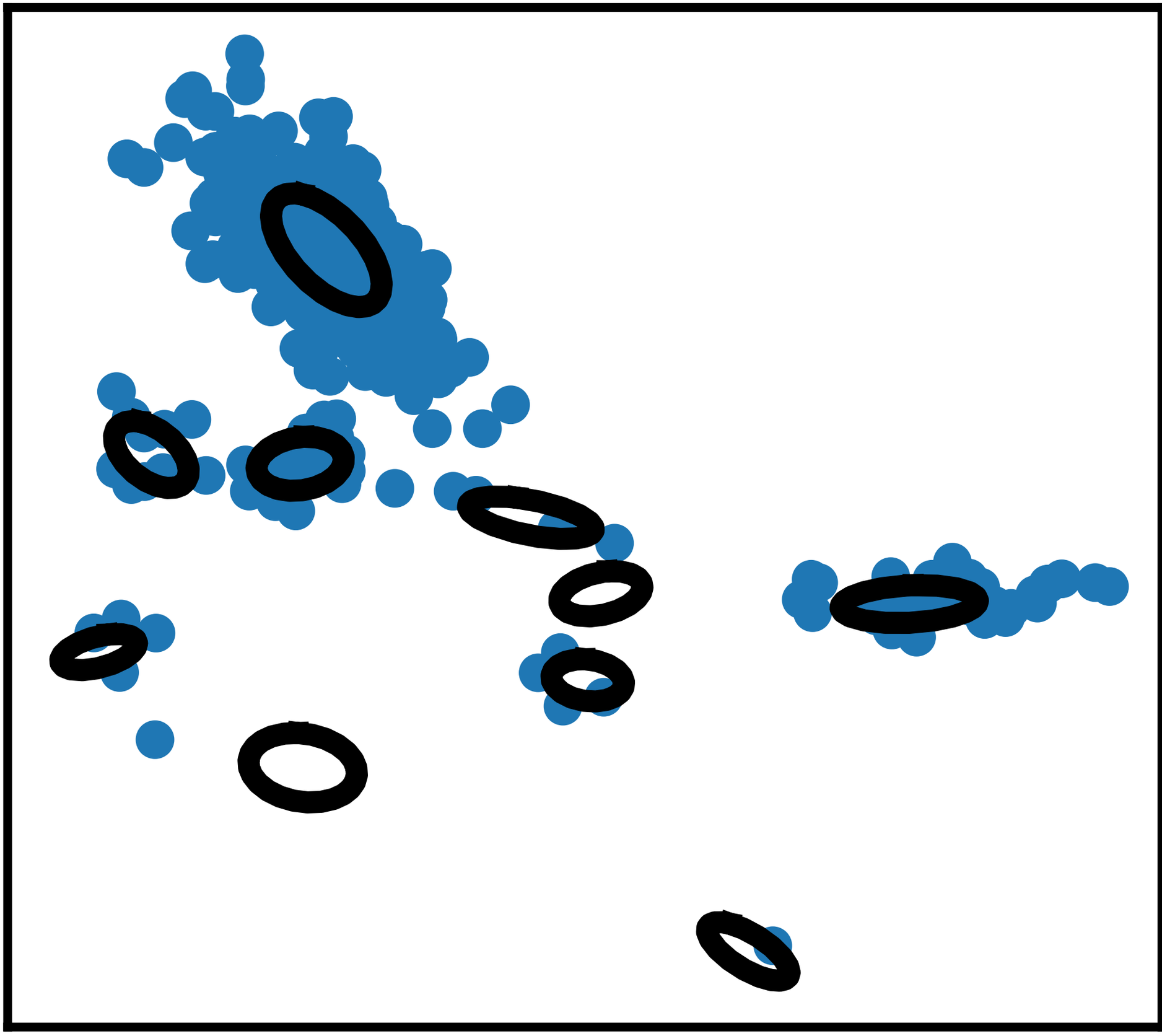alpha= 2.0 , N= 500