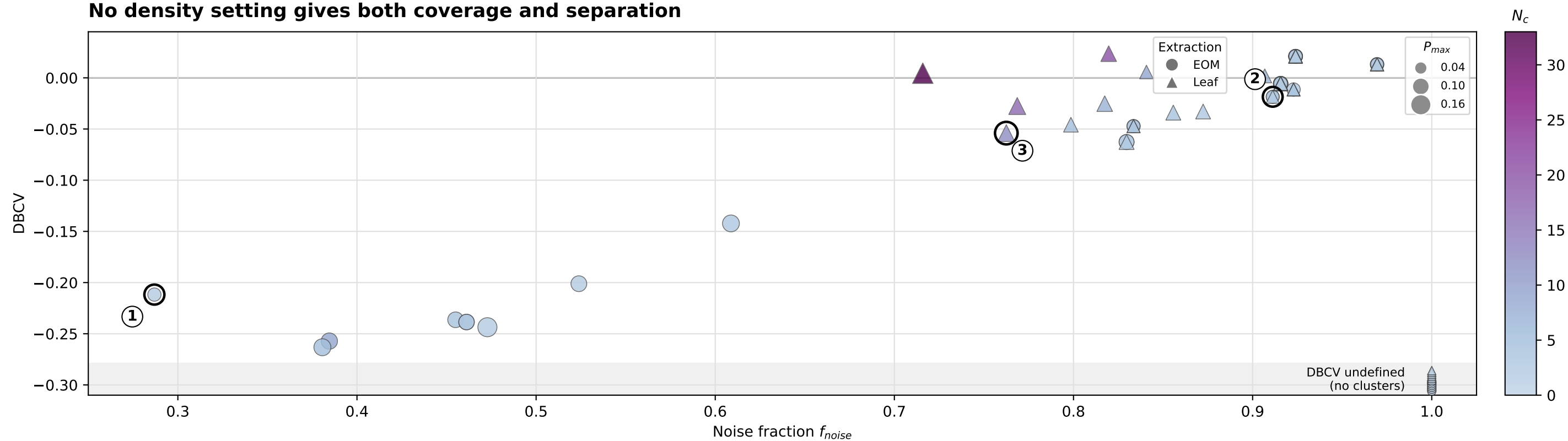


HDBSCAN does not yield a robust categorical wave-state taxonomy

A

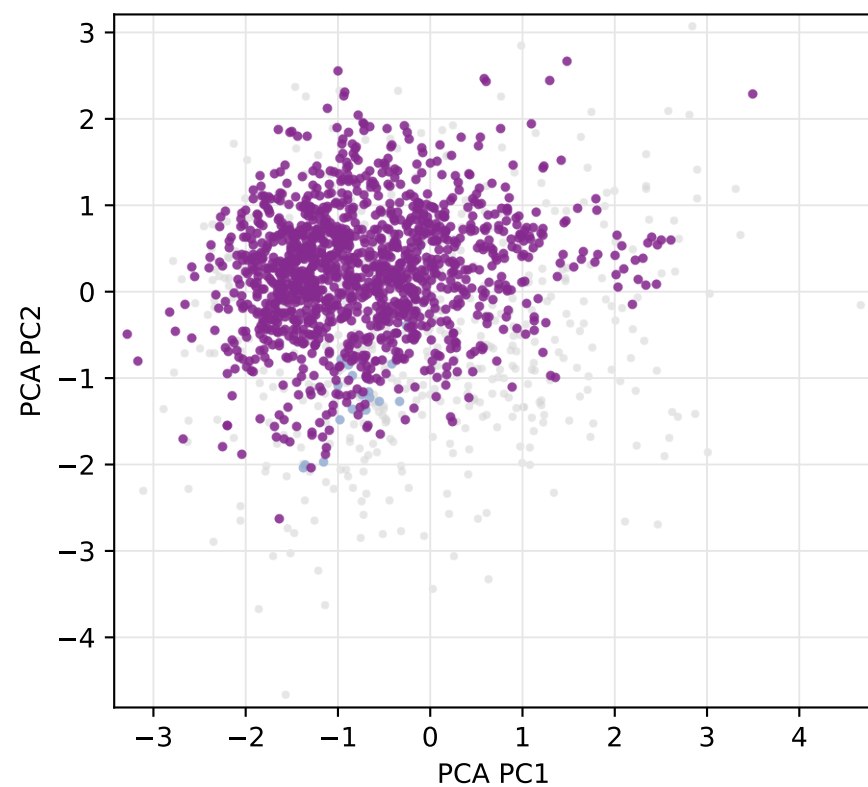
No density setting gives both coverage and separation



B

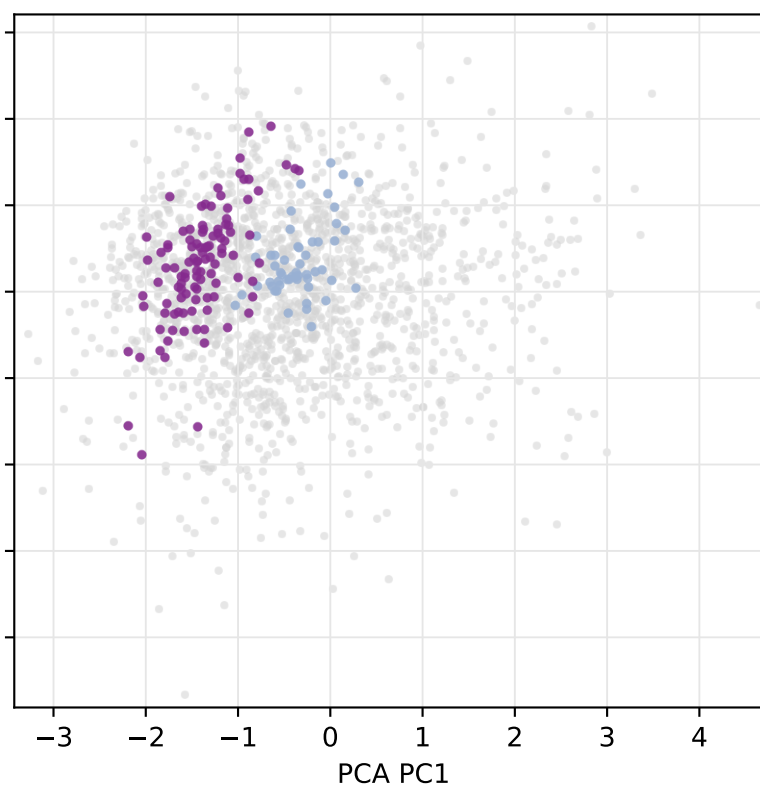
1. Permissive EOM

$N_c=2$ $f_{noise}=0.287$
DBCV=-0.212 $P_{max}=0.047$



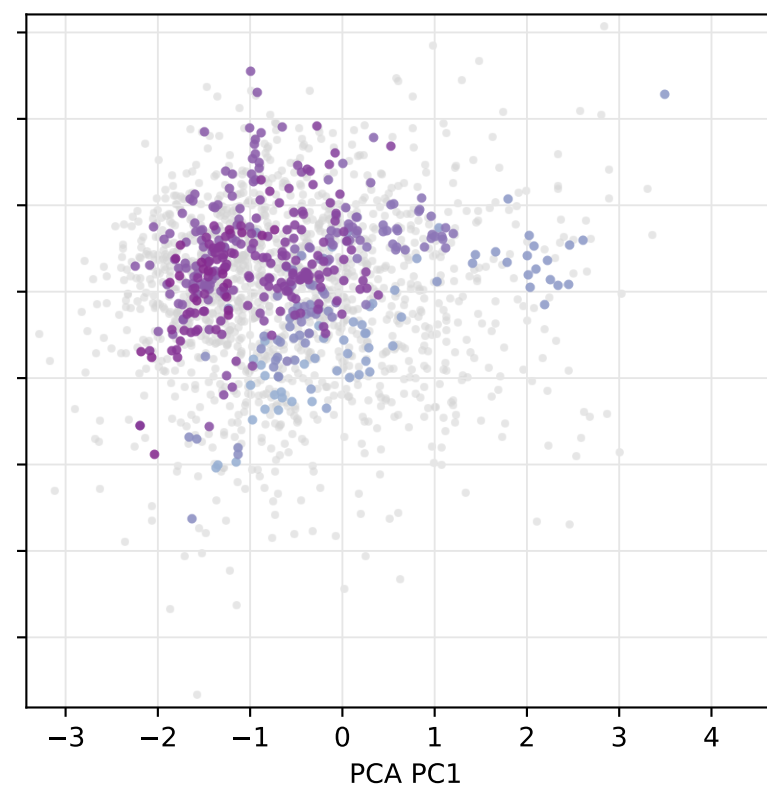
2. Moderate EOM

$N_c=2$ $f_{noise}=0.911$
DBCV=-0.019 $P_{max}=0.042$



3. Permissive leaf

$N_c=12$ $f_{noise}=0.762$
DBCV=-0.054 $P_{max}=0.097$

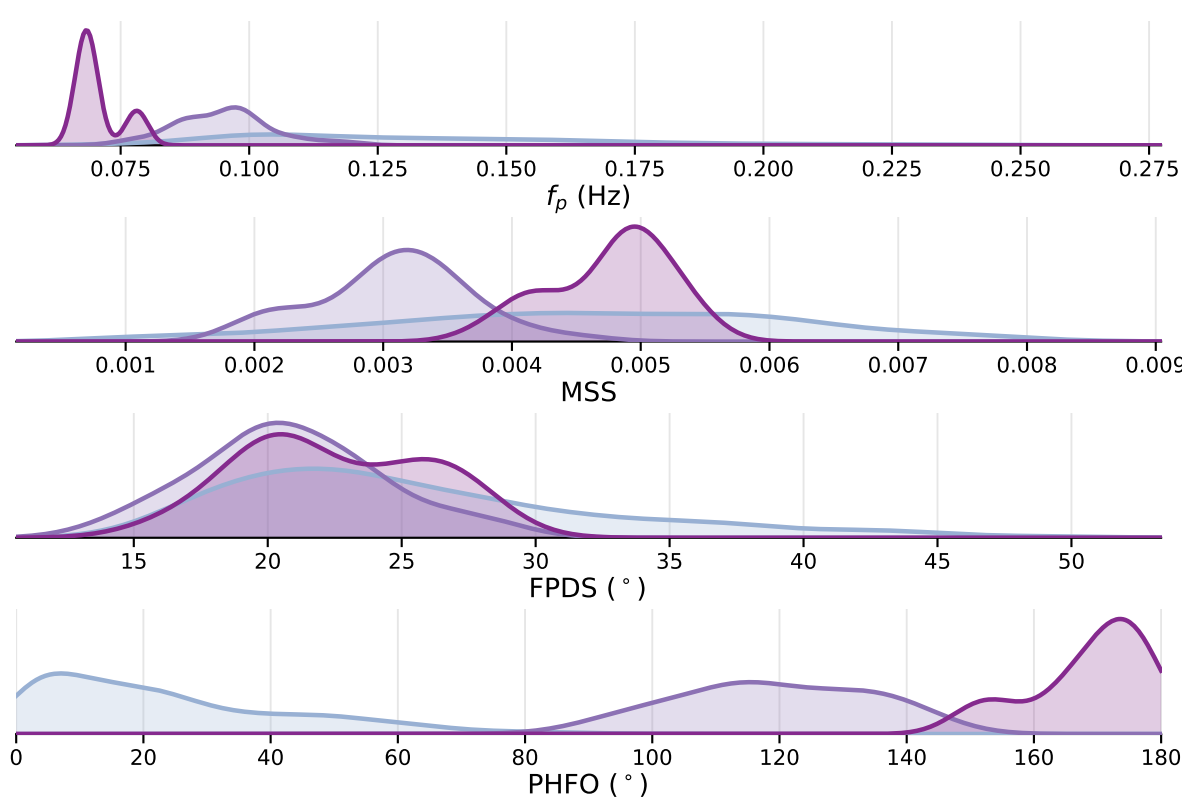


Identical observations and PCA coordinates.
Gray = HDBSCAN noise;
BuPu colors are local to each solution.

C

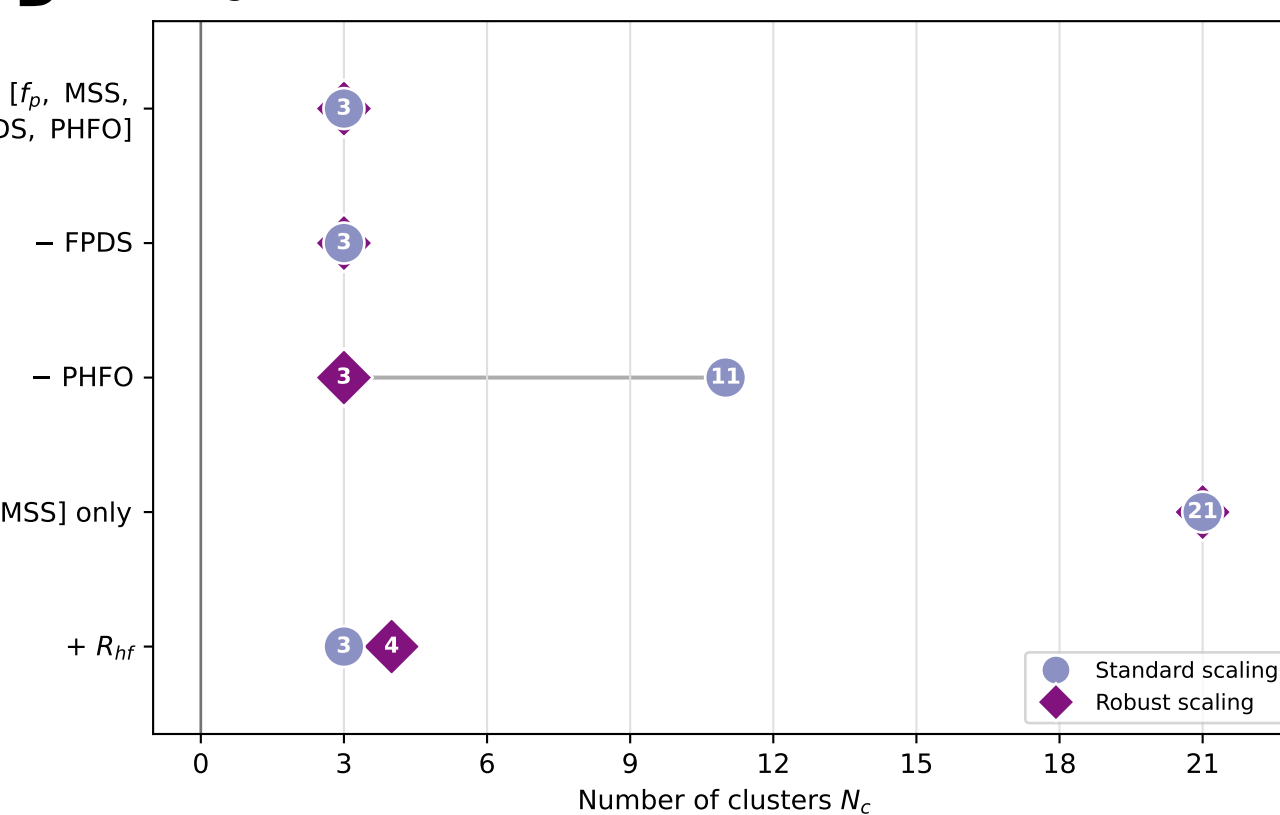
Cluster overlap in the full four-feature solution

Cluster 1 (n=1,450) Cluster 2 (n=41) Cluster 0 (n=26)



D

Feature definitions produce different categorical answers



standard / robust

noise = 0.16 / 0.14
ARI = 1.00 / 1.00

noise = 0.09 / 0.09
ARI = 0.65 / 0.68

noise = 0.54 / 0.30
ARI = -0.14 / 0.25

noise = 0.08 / 0.08
ARI = 0.02 / 0.02

noise = 0.21 / 0.18
ARI = 0.75 / 0.70