

# Coherent set detection

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Perform and visualize a coherent set detection on the Bickley jet using the deeptime Bickley jet dataset with 3000 particles:

```
import deeptime
deeptime.data.bickley_jet(n_particles=3000)
```

and fitting a VAMP estimator (`deeptime.decomposition.VAMP`) as well as a VAMP-Net to it.

- In the case of VAMP, featurize the data through a random featurization with a high degree of nonlinearity. We recommend something like

$$\chi(x) = W_2 \exp \left[ (W_1 x + b_1)^2 \right] + b_2,$$

where  $k = 1, \dots, 500$ ,  $W_i \in \mathbb{R}^{500,2}$  with entries sampled from a normal distribution and  $b_i \in \mathbb{R}^{500}$  with entries sampled from  $\mathcal{U}(-1, 1)$ . But you can play around and explore different featurizations. In case of a VAMPNet this featurization is not necessary.

- Afterwards perform a clustering of the top nine singular functions and assign data to the cluster centers with subsequent visualization.
- What are the qualitative differences?