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Model agnostic searches in High Energy and Astrophysics with CURTAINs

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We present CURTAINs, a fully data driven paradigm that improves on the weakly supervised searches. CURTAINs is designed to be sensitive to small density perturbations in n-dimensional feature space caused by the presence of signals. CURTAINs can be shown to be very robust in the absence of any signals, and yet be highly sensitive to signals even at very low signal to background ratios.

Originally designed for new physics searches in High Energy Physics, we also show applications in astrophysics, where certain searches can be cast as overdensity estimation. Particularly, searches for stellar streams in the Milky Way can be improved significantly with data driven and model agnostic searches such as CURTAINs.

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