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Programs that Think. Programs that Love. Programs that Identify the Composition of Ultra High Energy Cosmic Rays. MICHAEL GUSSERT, Colorado State University: Fort Collins, THE PIERRE AUGER OBSERVATORY COLLABORATION — The use of evolutionary neural network techniques to identify the composition of ultra high energy cosmic rays is being explored. The air shower parameters measured by the Pierre Auger Observatory cannot easily identify the composition of the shower primary. However, Artificial Neural Networks (ANNs) can be evolved to learn the dependence of these parameters on the primary composition. Once completed, such a network would then be able to estimate the composition of the primary for a given air shower. A modified version of the Symbiotic, Adaptive, Neuro-Evolution (SANE) algorithm is being studied to allow neurons within the network to specialize in a specific aspect of the dependence.

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