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Authors: ***P. S. LOW**, T. J. SEJNOWSKI;
Crick-Jacobs Center and CNL, Salk Institute, La Jolla, CA.

Traditional sleep scoring decomposes human sleep into SWS, Intermediate sleep (IS) and REM states, based on the Rechtschaffen-Kales (RK) method which relies on multiple channels of data. Sleep Electroencephalograms (EEGs) have a $1/f$ distribution, i.e. lower frequencies have more power than higher frequencies. This $1/f$ spectral distribution thus obscures higher frequency signals which are therefore not as readily detected by a human observer. Here we show that by normalizing power information across time for each frequency in a single channel of human sleep EEG, new features -independent of raw power- appear that allow for SWS, IS, REM states as well as Wakefulness to be automatically identified by an unsupervised clustering algorithm, consistent with manual scoring by experts. This approach corroborates the existence of the traditionally defined human sleep states (RK) and has enriched their unique features while obviating the need for multiple channels of data. Preliminary analysis at a 1 sec resolution reveals the presence of a novel human sleep state.

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