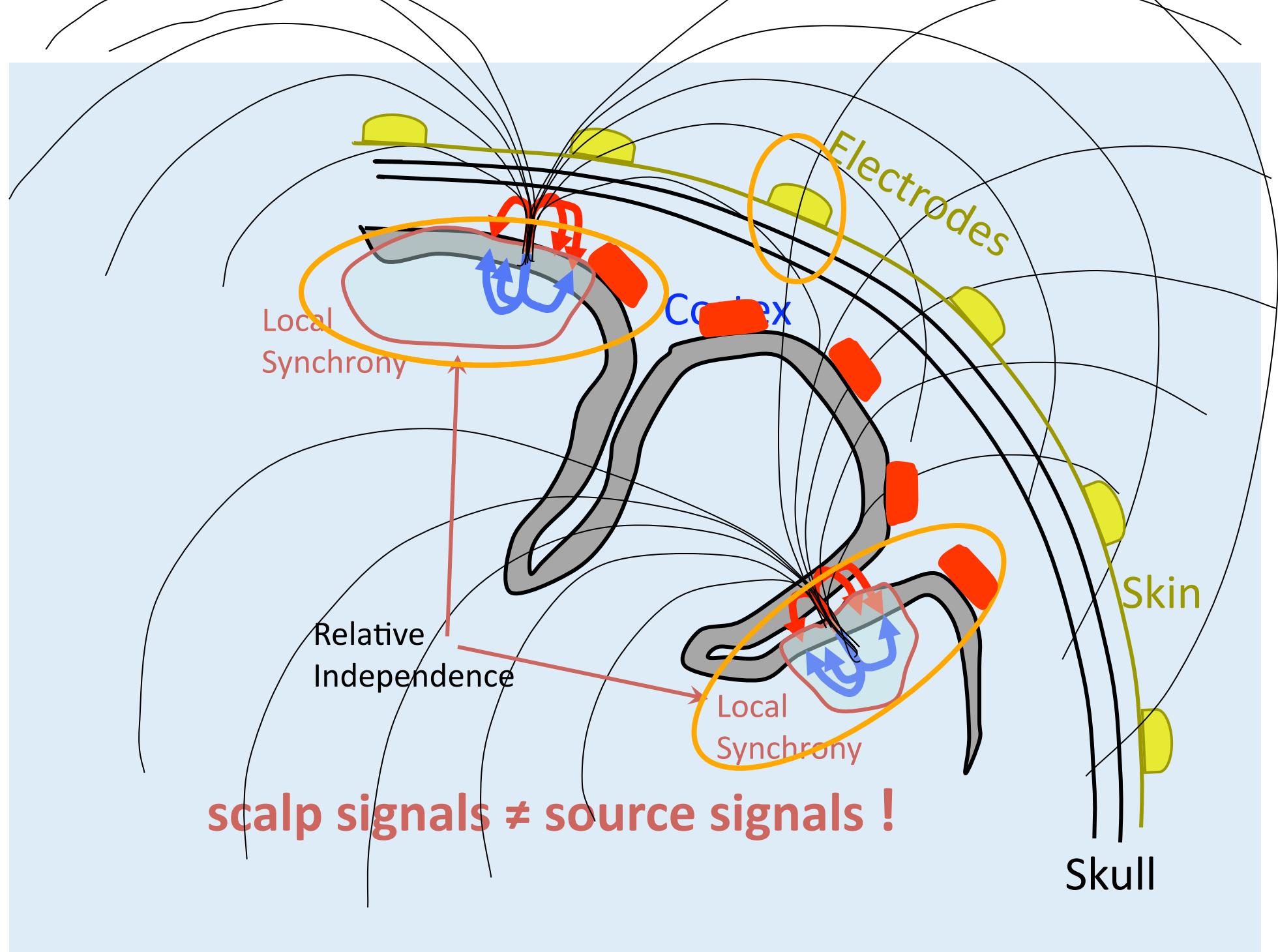


The diagram illustrates the complex process of EEG signal generation and measurement. It shows a cross-section of a head with various layers: skin, skull, and brain. Multiple colored arrows (red, blue, green) represent different neural signals (currents and magnetic fields) originating from various regions of the brain. These signals pass through the skull and skin to reach the scalp surface. Electrodes, represented by yellow circles, are placed on the scalp to detect these surface signals. Labels include "Electrodes" at the top right, "Skin" on the right side, "Skull" at the bottom right, "Relative Independence" on the left, and "Local Synchrony" near the bottom center. The text "Brain EEG ≠ Scalp EEG" is prominently displayed in large blue letters across the center of the diagram.

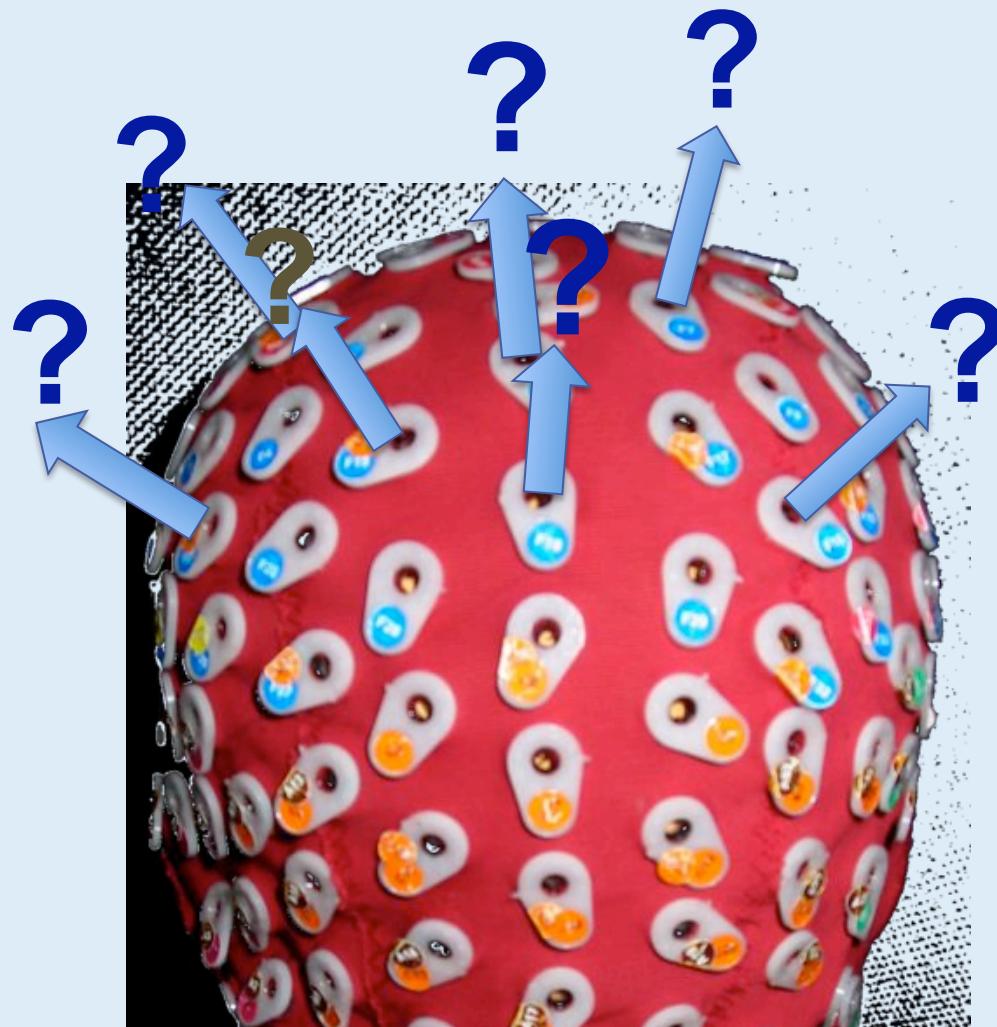
Brain EEG ≠

Scalp EEG

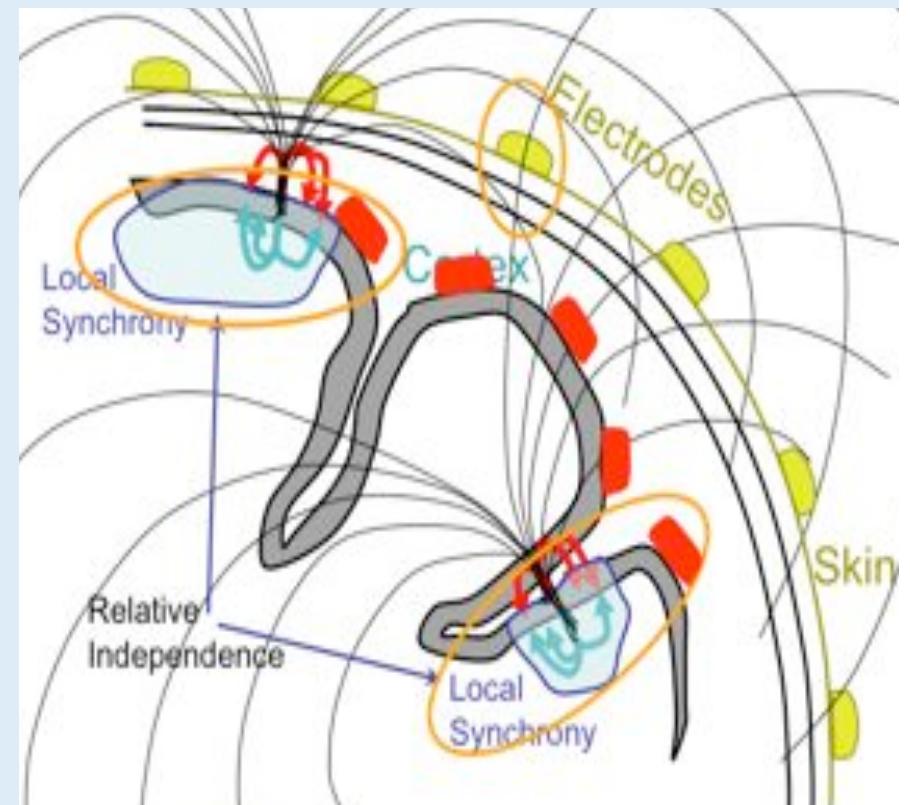
scalp signals ≠ source signals !



Naïve 2-D interpretation of EEG signals?



Cortical EEG signal projection patterns as point processes

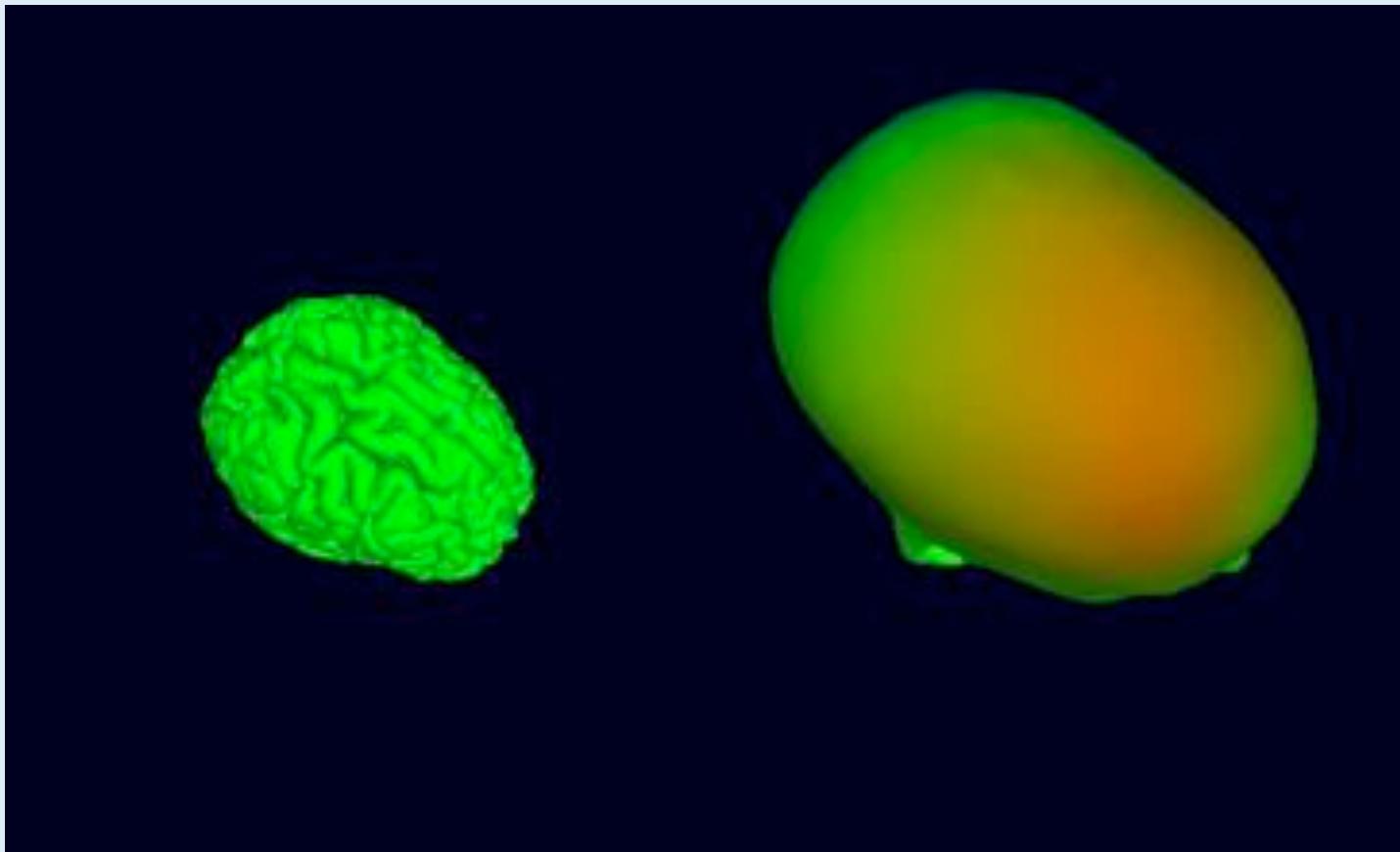


Actual cortical source volume conduction patterns (cartoon)

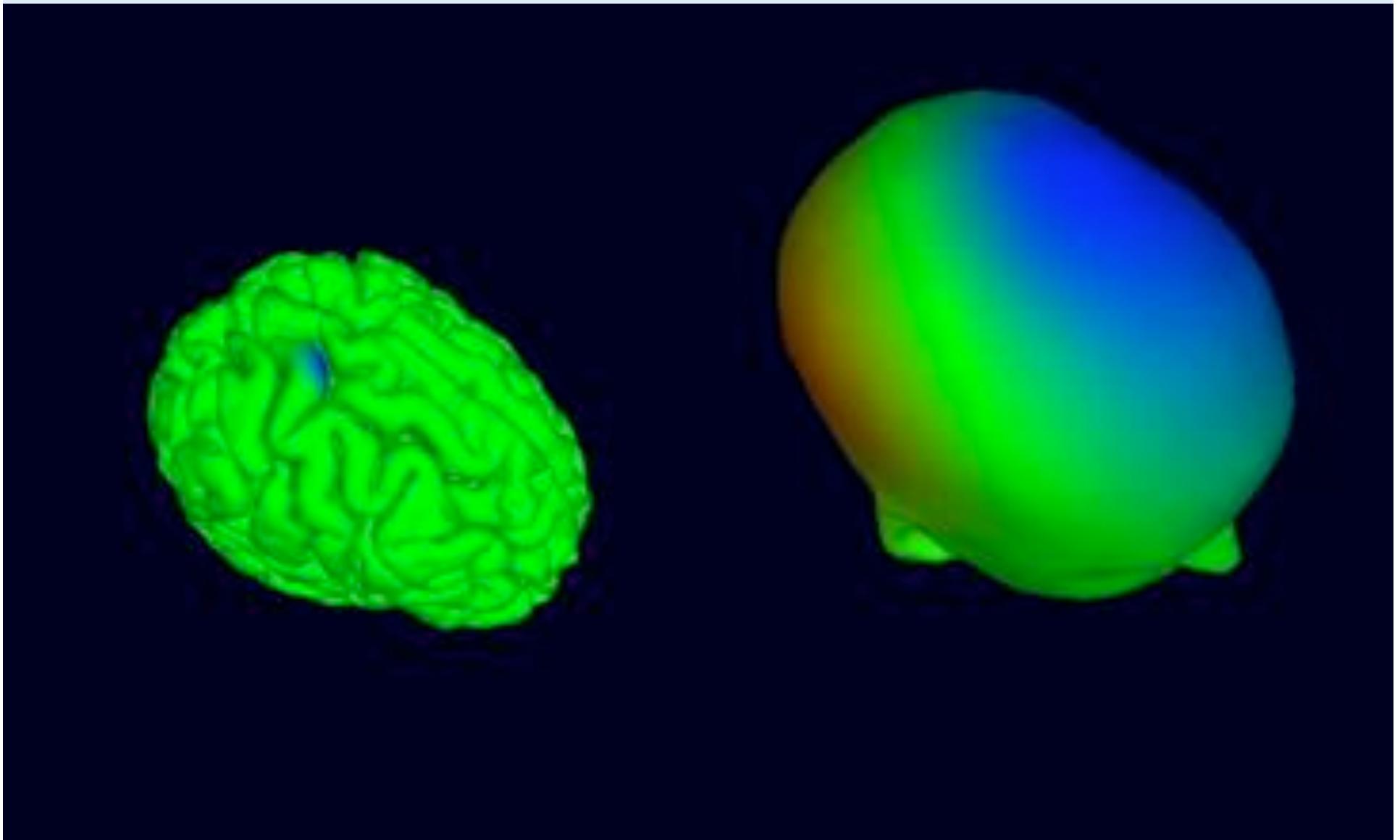


"Surely, Dr. Lowe, if there were gravity waves, we would have detected them by now."

The very broad EEG point-spread function



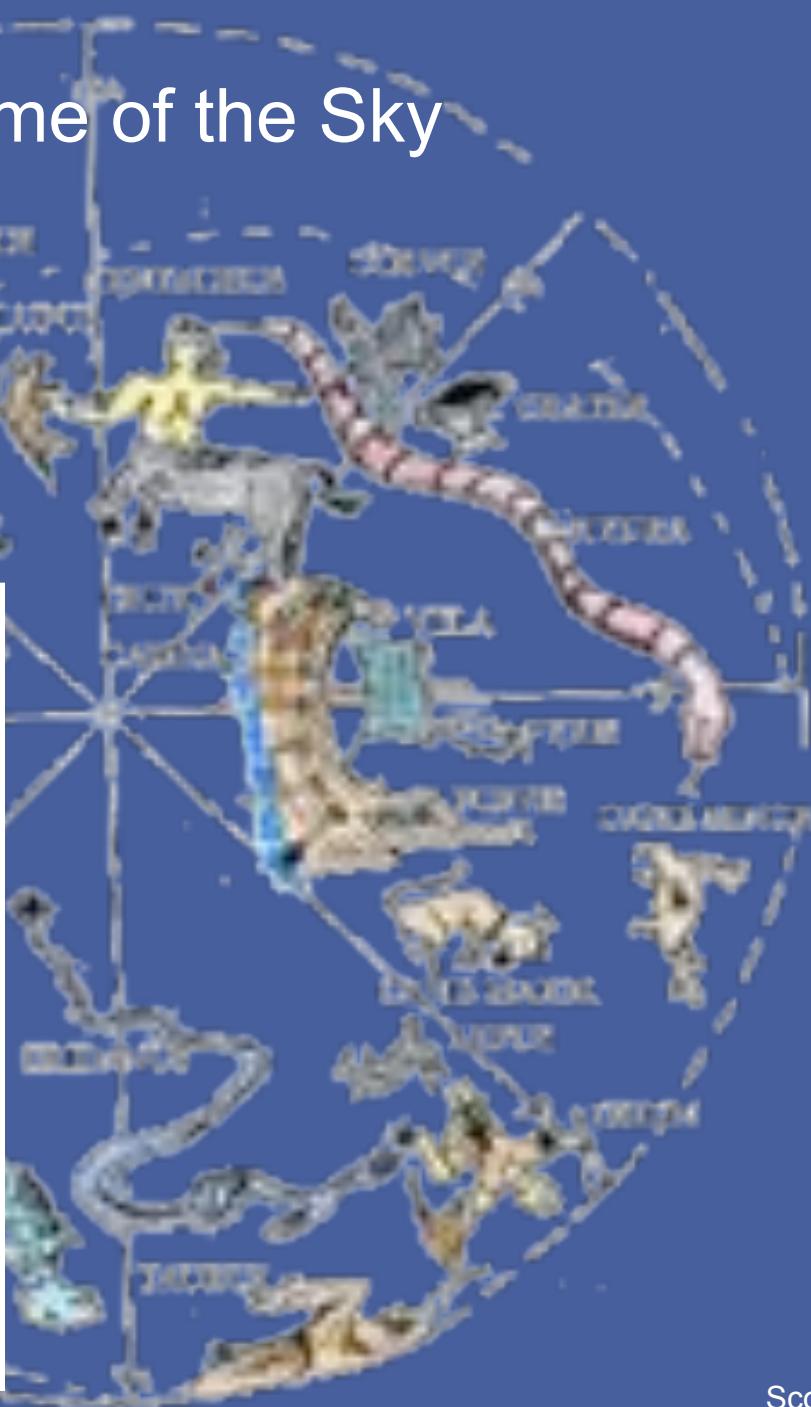
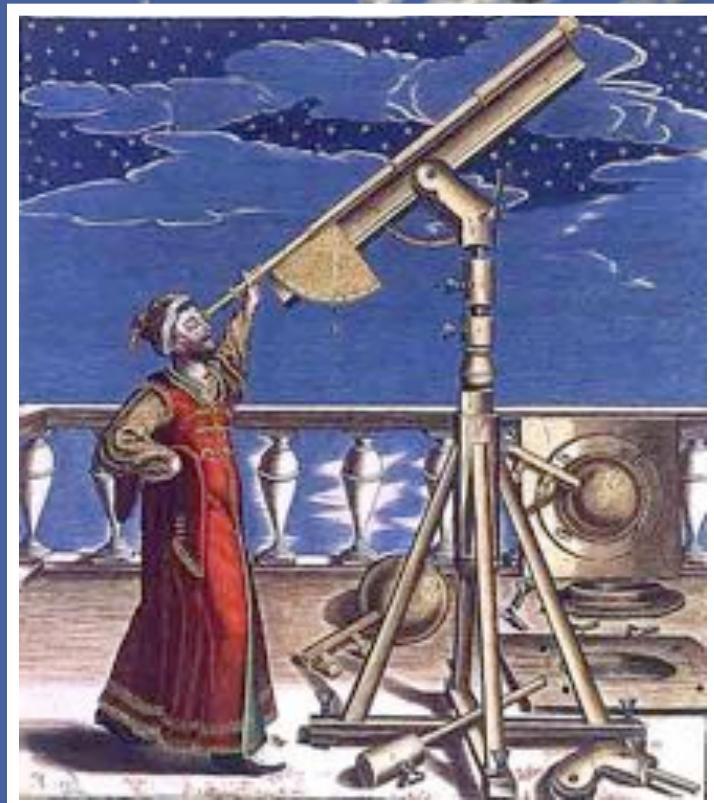
The very broad EEG point-spread function



Single spatially labile source

Z. Akalin Acar & S. Makeig 2010

The Dome of the Sky

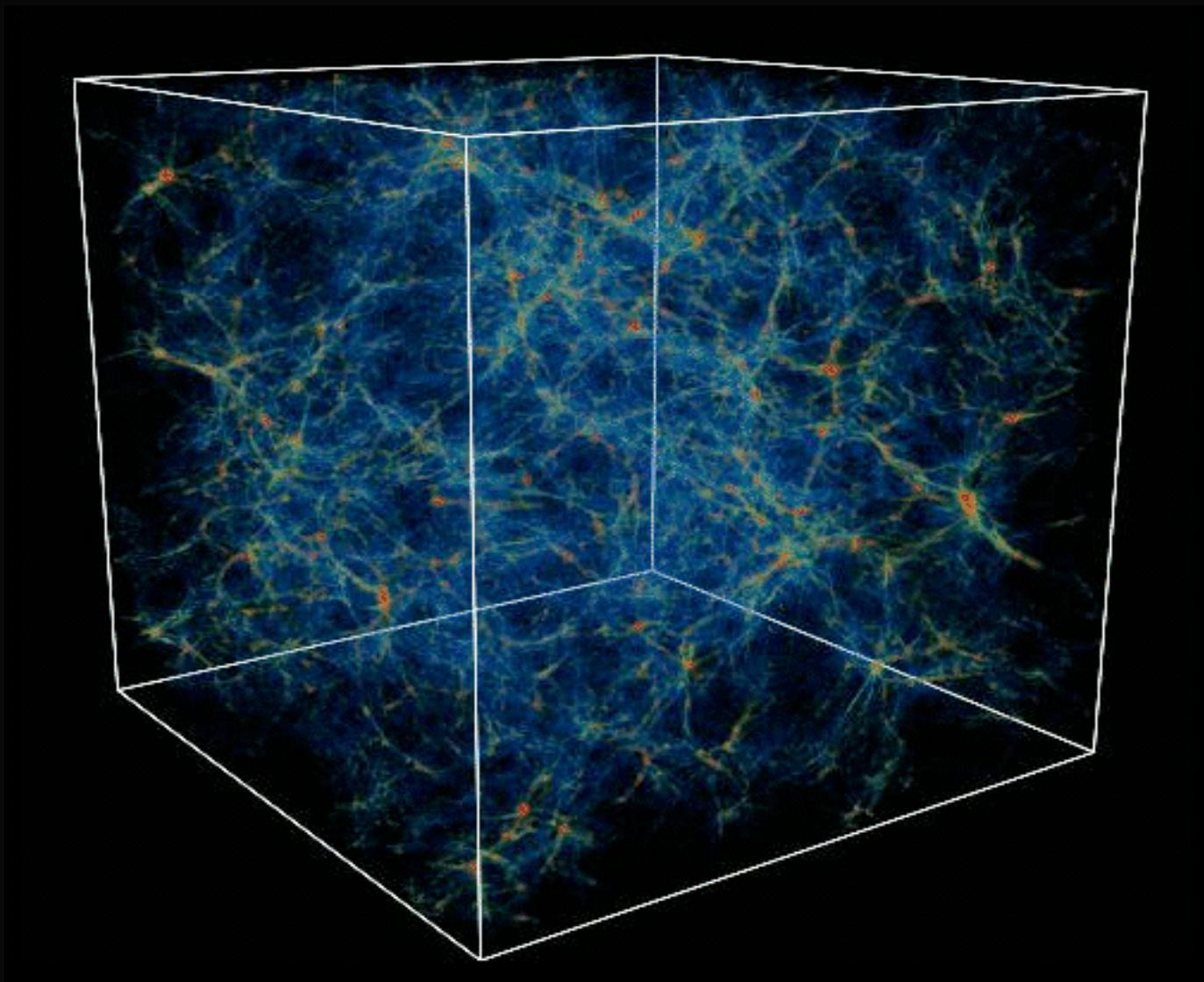


Scott Makeig 2008

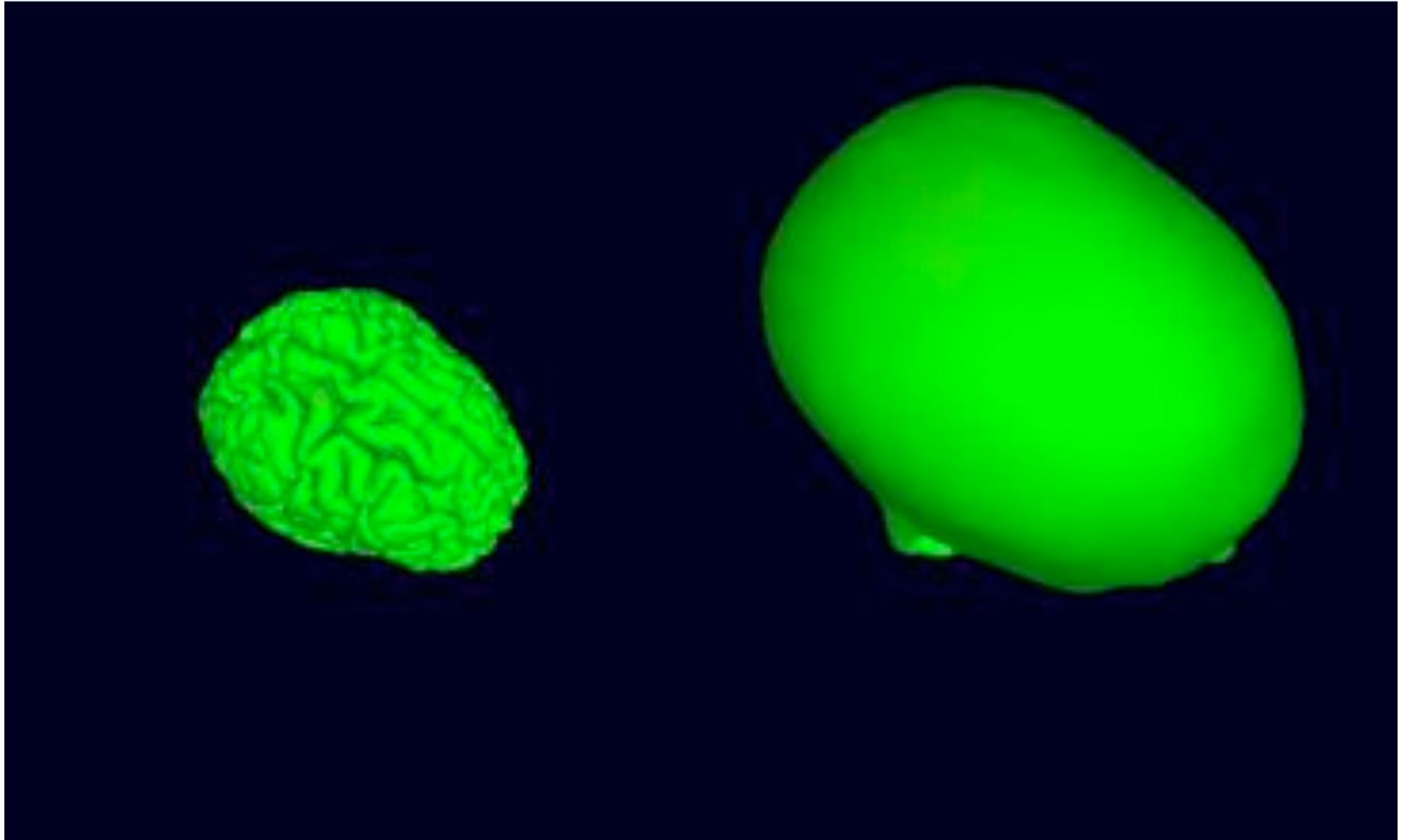


Stephen L. Alvarez

3-D structure of the Universe



The very broad EEG point-spread function

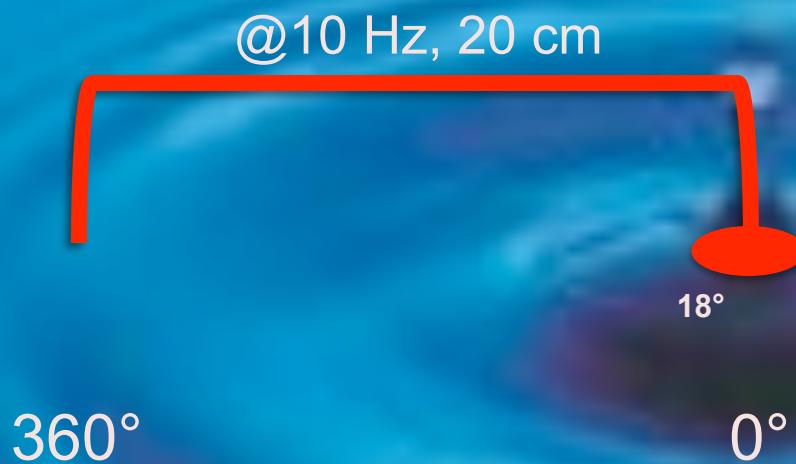


Spatially static cortical patch source

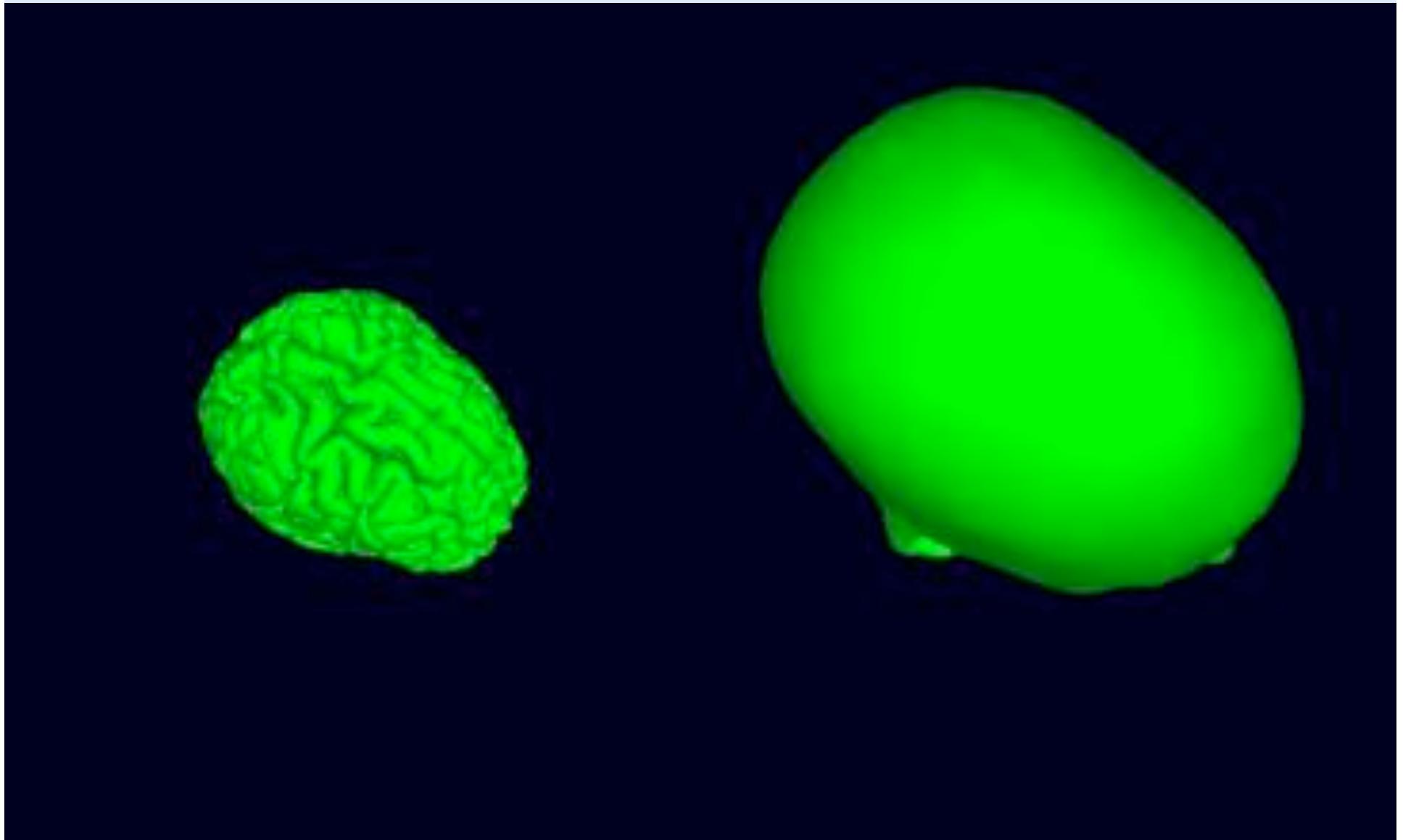
Z. Akalin Acar & S. Makeig 2010

Phase cones (Freeman)

Avalanches (Plenz)



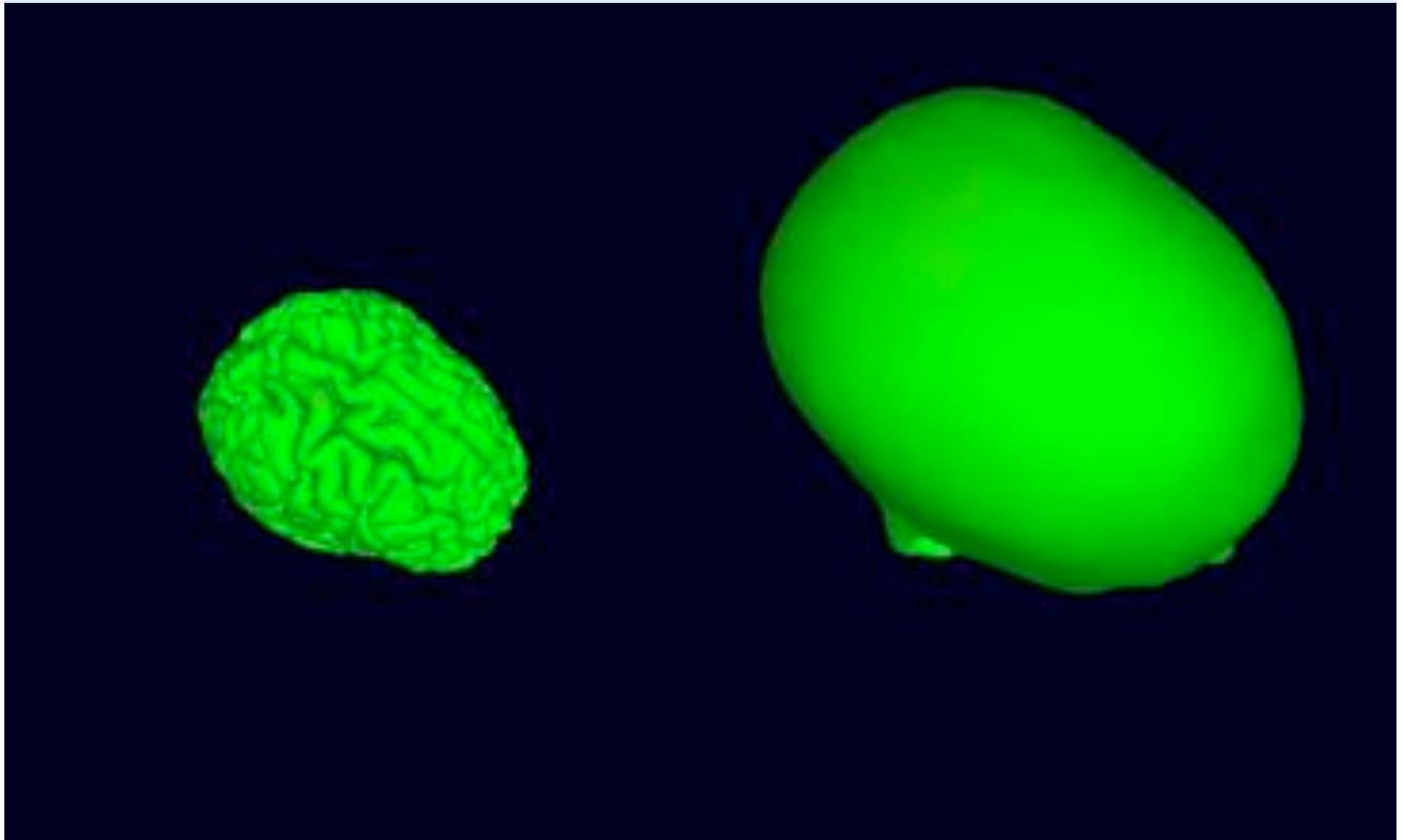
The very broad EEG point-spread function



Phase lag, center to edge: 18°

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The very broad EEG point-spread function



Phase lag, center to edge: 0°

Z. Akalin Acar & S. Makeig 2010