Unlike conventional DBS leads, which use cylindrical electrodes, directional leads comprise radially segmented electrodes that allow the stimulation field to be moved in the plane perpendicular to the lead, or shaped using anodes and cathodes to steer stimulation in a particular direction, based on the needs of individual patients.

There are currently two commercially available systems with similar electrode designs. A principal differentiator is how they deliver current: one uses a single current source, the other multiple independent current sources.

A multiple independent current-controlled system can steer the field toward any of the 360 ° on the circumference of the lead by shifting current in small increments between adjacent directional contacts. In a single-source system, with three contacts in a segmented row, the field depends on orientation and shape on the impedances of the individual directional contacts. If the impedances of the three contacts are unequal, the current distribution is distorted toward the contacts with lower impedances. This can be problematic if the impedance of a contact unexpectedly changes, as the geometry of activated tissue would be suddenly altered and the clinical effects with it.