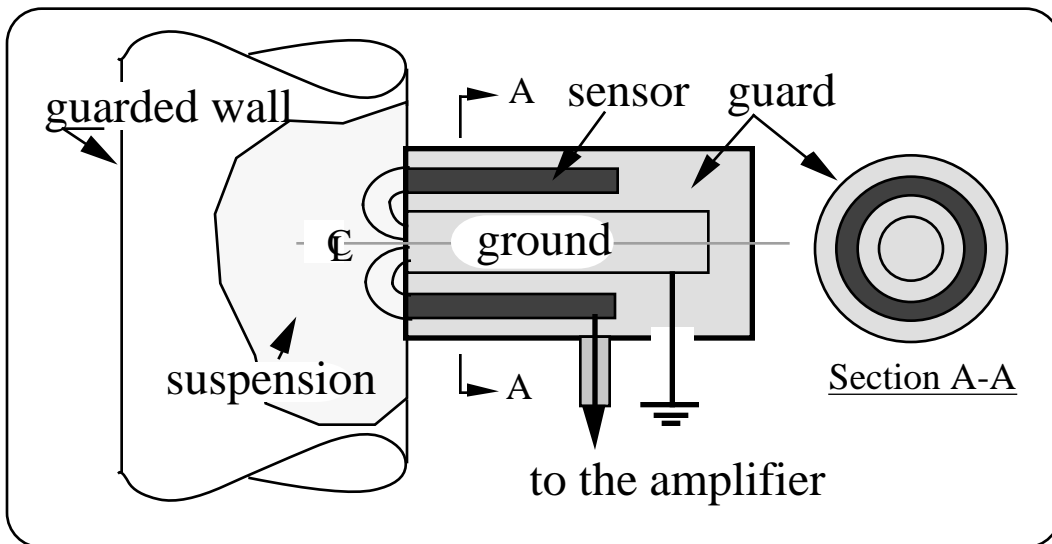


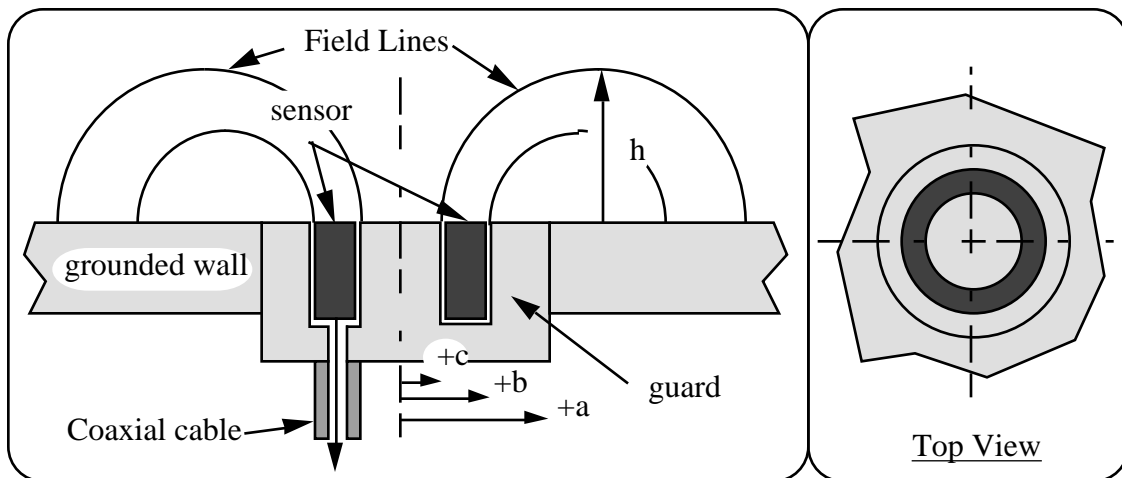
M. Louge, M. Tuccio, E. Lander and P. Connors: "Capacitance Measurements of the Volume Fraction and Velocity of Dielectric Solids Near a Grounded Wall," *Rev. Sci. Instrum.* **67** (5), 1899-77 (1996).

We describe capacitance probes that infer the volume fraction of solids near a grounded wall from a measurement of the effective dielectric constant of the suspension. The probes consist of three conductors, namely the sensor, guard and ground surfaces. The instrument records capacitance between the sensor and ground by supplying an oscillating current of constant amplitude to the sensor. A control circuit maintains the guard and sensor voltages equal without affecting the sensor circuit. Because it surrounds the sensor conductor everywhere except at the probe surface, the guard eliminates stray and cable capacitances. By locating the ground at the periphery of the probe, this configuration renders the new instrument particularly useful in metallic vessels. Cross-correlation of the signals from two adjacent capacitance probes also permits measurements of the velocity of dielectric solids.

Figure excerpts



The "wall" capacitance probe. Dimensions are not to-scale. In this configuration, the wall is held at the guard voltage.



The “grounded” capacitance probe. In this configuration, the wall is held at the ground voltage.