

Abstract Submitted  
for the DFD17 Meeting of  
The American Physical Society

**Characterizing the performance of an affordable, multichannel conductivity probe for density measurements in stratified flows** BALAJI SUBRAMANIAN, University of California Santa Barbara, MARCO CARMINATI, Politecnico di Milano, Milano, PAOLO LUZZATTO-FEGIZ, University of California Santa Barbara — In stratified flows, conductivity (combined with temperature) is often used to measure density. The conductivity probes typically used can resolve very fine spatial scales, but on the downside they are fragile, expensive, sensitive to environmental noise and have only single channel capability. Recently a low-cost, robust, arduino-based probe called Conduino was developed, which can be valuable in a wide range of applications where resolving extremely small spatial scales is not needed. This probe uses micro-USB connectors as actual conductivity sensors with a custom designed electronic board for simultaneous acquisition from multiple probes, with conductivity resolution comparable to commercially available PME conductivity probe. A detailed assessment of performance of this Conduino probe is described here. To establish time response and sensitivity as a function of electrode geometry, we build a variety of shapes for different kinds of applications, with tip spacing ranging from 0.5-2.5 mm, and with electrode length ranging from 2.3-6 mm. We set up a two-layer density profile and traverse it rapidly, yielding a time response comparable to PME. The Conduino's multi-channel capability is used to operate probe arrays, which helps to construct density fields in stratified flows.

Balaji Subramanian  
University of California Santa Barbara

Date submitted: 12 Sep 2017

Electronic form version 1.4