Gabriele La Nave* (lanave@illinois.edu). Fractional Virasoro Algebras.

In recent work with P. Phillips, we showed that it is possible to construct a generalization of the Virasoro algebra as a central extension of the fractional Witt algebra generated by non-local operators of the form, $L^a_n \equiv \left( \frac{\partial f}{\partial z} \right)^a$ where $a \in \mathbb{R}$ and $\left( \frac{\partial f}{\partial z} \right)^a$ is the fractional holomorphic derivative. The Virasoro algebra is explicitly of the form,

$$[L^a_m, L^a_n] = A_{m,n}(s) \otimes L^a_{m+n} + \delta_{m,n} h(n)cZ^a$$

where $A_{m,n}(s)$ is a specific meromorphic function depending on Gamma functions, $c$ is the central charge (not necessarily a constant), $Z^a$ is in the center of the algebra and $h(n)$ obeys a recursion relation related to the coefficients $A_{m,n}$. In fact, we show that all central extensions which respect the special structure developed here which we term a multmodule Lie-Algebra, are of this form. This result provides a mathematical foundation for non-local conformal field theories, in particular recent proposals in condensed matter in which the current has an anomalous dimension. (Received July 30, 2018)