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Wenxiong Chen* (wchen@yu.edu), 2495 Amsterdam Av, New York, NY 10033, and **Congming Li** (cli@colorado.edu) and **Yan Li** (yali3@yu.edu). *A direct method of moving planes for the fractional Laplacian.*

In this talk, we will introduce a direct *method of moving planes* for the fractional Laplacian. Instead of using the conventional extension method introduced by Caffarelli and Silvestre, we work directly on the non-local operator. Using the integral defining the fractional Laplacian, by an elementary approach, we first obtain the key ingredients needed in the *method of moving planes* either in a bounded domain or in the whole space, such as *strong maximum principles for anti-symmetric functions*, *narrow region principles*, and *decay at infinity*. Then, using simple examples, semi-linear equations involving the fractional Laplacian, we illustrate how this new *method of moving planes* can be employed to obtain symmetry and non-existence of positive solutions.

We firmly believe that the ideas introduced here can be applied to more general non-local operators with much more general nonlinearities. (Received January 08, 2015)