1086-81-1189 **Jean Bourgain**, IAS, Princeton, NJ, **F. Alberto Grunbaum*** (`grunbaum@math.berkeley.edu`), UC Berkeley, Berkeley, CA 94720, **Luis Velazquez**, Universidad de Zaragoza, Zaragoza, Spain, **Albert Werner**, Institute for Theoretical Physics, Leibnitz University, Hannover, Germany, **Reinhard Werner**, Hannover, and **Jon Wilkening**, UC Berkeley, Berkeley, CA 94720. *Spectral analysis of state and site recurrence for discrete unitary evolutions.* Preliminary report.

The notion of state recurrence introduced in (GVWW) F. A. Grünbaum, L. Velazquez, A. Werner and R. Werner is extended to consider site (or subspace) recurrence.

A characterization of recurrence is given in terms of the matrix valued Schur function associated to the spectral measure of the subspace in question.

We give a topological interpretation for the expected return time to a site along the lines of GVWW.

These results are illustrated with analytical computations for one dimensional quantum walks as well as with pictures in the case of a few two dimensional quantum walks extensively studied in the literature. (Received September 24, 2012)