1020-37-73 **Ciprian demeter*** (`demeter@math.ucla.edu`), 606 Levering Ave., Apt 201, Los Angeles, CA 90024. *Breaking the duality in the "Return times" theorem.* Preliminary report.

Bourgain proved the following Return times theorem: Let $\mathbf{X} = (X, \Sigma, \mu, \tau)$ be a dynamical system. Let also $1 \le p, q \le \infty$ be such that $\frac{1}{p} + \frac{1}{q} \le 1$. For each function $f \in L^p(X)$ there is a universal set $X_0 \subseteq X$ with $\mu(X_0) = 1$, such that for each second dynamical system $\mathbf{Y} = (Y, \mathbf{F}, \nu, \sigma)$, each $g \in L^q(Y)$ and each $x \in X_0$, the averages

$$\frac{1}{N}\sum_{n=1}^{N} f(\tau^n x) g(\sigma^n y)$$

converge ν almost everywhere. We prove that the result remains true if $p > 1$ and $q \ge 2$. The ideas behind the proof are related to those involved in the Carleson-Hunt theorem on the convergence of the Fourier series. We also prove similar results for the analog of Bourgain's theorem for series, where no positive results were previously known. This is joint work with Michael Lacey, Terence Tao and Christoph Thiele. (Received August 14, 2006)