1063-60-248 **Todd Kemp*** (tkemp@math.ucsd.edu), La Jolla, CA, **Ivan Nourdin** (inourdin@gmail.com), Nancy, France, **Giovanni Peccati** (giovanni.peccati@gmail.com), Kirchberg, Luxembourg, and **Roland Speicher** (speicher@mast.queensu.ca), Saarbrucken, Germany. *Chaos and the Fourth Moment.*

The Wiener chaos is a natural orthogonal decomposition of the L^2 space of a Brownian motion; it is the backbone upon which more sophisticated tools like Malliavin calculus are built. In 2005, Nualart and Peccati proved a remarkable Central Limit Theorem: in a fixed order of chaos, convergence to a normal law is equivelent to convergence of the fourth moment.

In this talk, I will briefly describe the analogue of the Wiener chaos in free probability (the probability theory that governs the density of eigenvalues of large random matrices). The very same central limit theorem holds true, but the techniques required for the proof are very combinatorial. Time permitting, I will also discuss applications of this central limit theorem and further refined results using free Malliavin calculus. (Received August 17, 2010)