**Assignment 6: Wavepackets + Random Number Generation**

1. **Initial Investigations**

Begin with the ROOT macro that has been uploaded to Scholar called graph\_wavepacket.C (Wavepacket Example).

Use the program to compare the case of adding nine equal amplitude waves distributed between –Delta(k) and +Delta(k) to the exact Fourier transform result using a uniform distribution from –Delta(k) to +Delta(k).

How do the two power spectra compare in width and amplitude?

2. **Randomization**

Modify the above macro to compute the power spectrum for the sum of 100 waves with a wavenumber chosen randomly between –Delta(k) and +Delta(k).

Compare each of the following cases to the uniform distribution Fourier transform result:

1. a uniform distribution of randomly chosen wavenumbers
2. a gaussian distribution of randomly chosen wavenumbers with sigma=Delta(k)/3.0