tern in the series it has the phase we want but the amplitude is not. If however, we can make

$$R_{nm} = \sin(\pi(S_{nm} - 1)/\pi(S_{nm} - 1) \tag{5}$$

then we can choose one order of the expansion to have the appearance we want. The function is invertable if R_{nm} and S_{nm} are in the range between zero and one. This is something easily controlled. A nice example would be the letter F Inverse Fourier transformed squeezed through this algorithm and then Fourier Transformed back. All on the computer. Here is what was done to make the image. Letter "F" was put on the screen, moved from

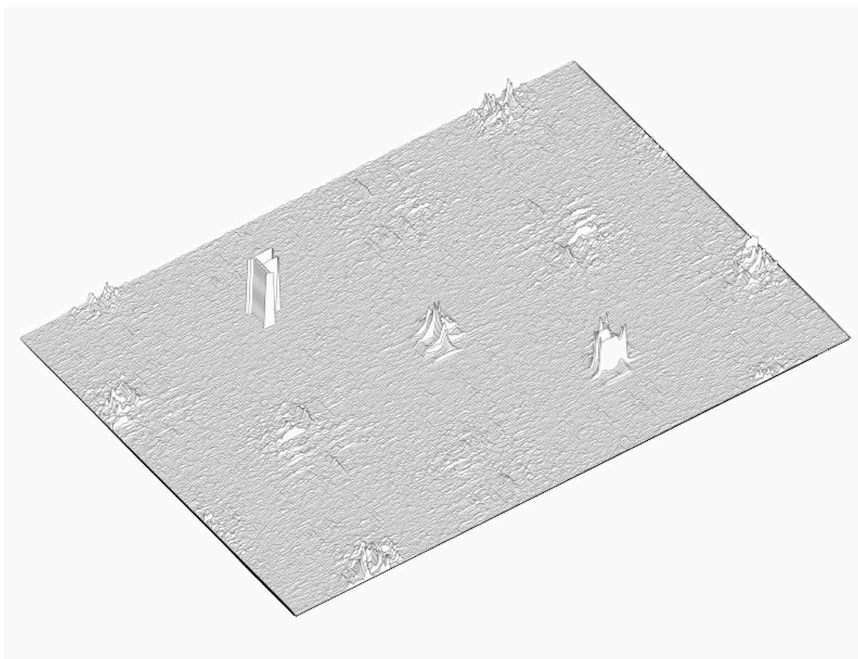

FIGURE 1. Letter 'F' phase encoded using algorithm alluded to above. Note the zero order at center [(0,0) removed] higher orders march off to the upper left and continue wrapping around the image. Negative orders go to the lower right.

the center to the location you see it, and then the Fourier transform found. The rusulting complex array was scaled to have a maximum magnitude of one and then converted to the form in equation (1). The phase information is saved. The amplitude information R_{nm} was put into the inverse of equation (5). The resulting S_{nm} was entered into expression (2) with the saved phase information. This is then converted to standard complex form and the Fourier transform calculated. To display the result it is necessary to set the center pixel to zero since the value there is huge.