PHOTON LIST SIMULATION

A photon list is a table of arrival times, detector numbers, and pulse heights for time-tagging telescope such as HESSI. A simulated photon list (also called a "score") can be used for:

- Testing HESSI hardware during development stages
  - Simulated throughput with a "pulser stimulator"
  - Simulation of dead-time effects, pulse pileup, etc.
- Testing HESSI software
  - Proving that mapping routines work
  - Identifying needs/uses/problems in utilities
  - Estimating times and memory required for analysis
- Providing a realistic, simple, model of HESSI output
  - for scientific users
  - and the general public (educational-outreach)

We have provided a simple score file in FITS format, along with an IDL program to read it and create a simple image. The file "score1K0-4.fits" is available on the hesperia ftp site, and can be accessed using anonymous ftp:

```
ftp hesperia.gsfc.nasa.gov
cd pro
binary
get score1K0-4.fits
get score2bp.pro
bye
```

Alternatively, you can use a browser: URL = http://hesperia.gsfc.nasa.gov/hessidoc/pro/, and download the aforementioned .fits and .pro files. The FITS file is displayed with the IDL program score2bp.pro, which back-projects the data onto 64 x 64 arrays. In IDL just type the command ".run score2bp", and you will be prompted for the name of the score file.

The following figure shows a 900-photon subset of the score file. Each "staff" shows 9 one-second timelines, with spatial frequency increasing up (collimators 1-9) and time going to the right. The photon arrival times from a point-source burst have been modulated by an analytical version of HESSI grids, and images can be constructed from the arrival times alone, as shown below in this paper.