1 Discussion of HESSI Symbols

There are a great number of algebraic quantities involved in imaging spectroscopy with the HESSI instrument, so it is worthwhile adopting some conventions on what symbols we will use. This is a first stab at choosing a set of unique symbols for HESSI imaging. Later we should add more symbols relevant to spectroscopy.

Symbol	Meaning	IDL var
t	Time (usually in binary μs)	time
N	Number of counts per time bin	n_bin
x^A, y^A	Yaw, pitch sun-center offset in spacecraft coordinates (μradians)	x_sc,y_sc
X_m, Y_m	Pixel m offset from map center in inertial coordinates	X_sun,Y_sun
α	Roll angle (μradians), measured CCW from X axis	alpha
β	Grid orientation in spacecraft coordinates (μradians)	beta
X^M, Y^M	Map center offset from Sun center in inertial coordinates	xm_sun,ym_sun
x^M, y^M	Map center offset in spacecraft coordinates	xm_sc,ym_sc
	$x^M = x^A + X^M cos\,\alpha + Y^M sin\,\alpha$	
	$y^M = y^A + Y^M cos\,\alpha - X^M sin\,\alpha$	
x_m, y_m	Location of mth map pixel in spacecraft coordinates	x_sc,y_sc
τ	Live time (binary fraction)	tau
T	Grid-response-matrix transmission (Step 5)	gridtran
A	Grid-response-matrix amplitude (Step 5)	modamp
Q	Peak grid-response-matrix offset (Step 5)	peak_grm_offset
p	Sub collimator pitch (FltPt microradians)	ang_pitch
Θ	Phase of map center relative to phase reference line (Step 6)	phase_map_ctr
	$\Theta = 2\pi(x^M cos\,\beta + y^M\, sin\,\beta \pm Q)/p$	
Θ	Phase of sun center relative to phase reference line	
	$\Theta_A = 2\pi(x^A cos\,\beta + y^A\, sin\,\beta \pm Q)/p$	
L_{mi}	Projected offset of pixel x_m, y_m	offset_proj
	$L_{mi} = x_m\, cos\,\beta + y_m\, sin\,\beta \pm Q$	
	$\quad = \Theta_A + X^M cos(\alpha+\beta) + Y^M sin(\alpha+\beta)$	
E_{mi}	Expected counts in time bin i from pixel m:	
	$E_{mi} = F_m \tau_i T_i \{1 + \sum_h A_{ih} cos[h(2\pi L_{mi}/p \pm Q_{ih}]\}$	counts_exp
F	Postulated flux	flux
h	Harmonic (1,2,3,...)	h
u, v	Coordinates in Fourier plane (visibility coverage)	u,v
i	Time bin index	i
m	Map pixel index	m

Guidelines:

1. Use Greek for angles and phases, with upper case reserved for “large” (i.e. $> 1^\circ$) angles.
2. Capital X,Y for inertial coordinates, l.c. x,y for spacecraft coordinates.
3. Superscripts for labels, subscripts for vector or matrix indices.
4. “Phase” is reserved for arguments of periodic functions, and to which arbitrary multiples of 2π can be added.