Galaxy Table:

Outstanding issues are to pin down units (i.e. mass measures). The apparent magnitudes will be reported as they appear above the atmosphere without galactic extinction.

In order to have a general description of the galaxy model, the database will store parameters for two Sersic profiles. One for the bulge and one for the disk. The Sersic parameters will be translated to disk/total and bulge/total ratios needed for the image simulator at select time.

These fields are defined as in Ciotti 1991 (Astron. Astrophys. 249, 99-106 (1991)). The assumed the parameterization is:

$$\Sigma(r) = \Sigma_c e^{-b_n (r/r_e)^{1/n}}$$

Where Σ_c is the central surface brightness, r_e is the half light radius, and n is the Sersic index (bulge: n=4, disk: n=1). b_n depends on n and for this definition of r_e and Σ_c. $b_n \simeq 2n - 0.324$; $b_n = 1.676$ for n=1 and $b_n = 7.676$ for n=4.

Galaxy			
Column Name	**Data Type**	**Keys**	**Comments**
ID	INT (BIGINT if catalogs will be larger than 10^9)	Primary	Catalog entry identifier
ra	DOUBLE	POS	Right Ascension (deg)
dec	DOUBLE	POS	Declination (deg)
redshift	FLOAT		Redshift
radial_velocity	FLOAT		Peculiar velocity in the radial direction (km/s)
u	FLOAT		Apparent magnitude in u (extincted)
g	FLOAT		Apparent magnitude in g (extincted)
r	FLOAT		Apparent magnitude in r (extincted)
i	FLOAT		Apparent magnitude in i (extincted)
z	FLOAT		Apparent magnitude in z (extincted)
y	FLOAT		Apparent magnitude in y (extincted)
SEDID_bulge	INT		ID of bulge SED metadata: Spectrum_meta.ID
SEDID_disk	INT		ID of disk SED metadata: Spectrum_meta.ID
SEDID_agn	INT		ID of AGN SED metadata:

			Spectrum_meta.ID
av_b	FLOAT		Reddening value for bulge of galaxy (0.0)
rv_b	FLOAT		R_V for extinction model for bulge (3.1)
ext_model_b	VARCHAR(5)		Extinction model identifier ('ccm')
av_d	FLOAT		Reddening value for disk of galaxy
rv_d	FLOAT		R_V for extinction model for bulge (3.1)
ext_model_d	VARCHAR(5)		Extinction model identifier ('ccm')
glon	FLOAT		Galactic longitude (deg)
glat	FLOAT		Galactic latitude (deg)
pa_b	FLOAT		Position angle of bulge (deg)
pa_d	FLOAT		Position angle of disk (deg)
inclination_b	FLOAT		Inclination of bulge to line of sight (deg)
inclination_d	FLOAT		Inclination of disk to line of sight (deg)
sb_eb	FLOAT		Central surface brightness of bulge (mag/arcsec^2)
r_eb	FLOAT		Half light radius of bulge (arcsec)
a_b	FLOAT		Semi-major axis of bulge (arcsec)
b_b	FLOAT		Semi-major axis of bulge (arcsec)
bulge_index	FLOAT		Sersic index of bulge (4)
bra	FLOAT		RA of bulge center (deg)
bdec	FLOAT		Dec of bulge center (deg)
sb_ed	FLOAT		Central surface brightness of disk (mag/arcsec^2)
r_ed	FLOAT		Half light radius of disk (arcsec)
a_d	FLOAT		Semi-major axis of disk (arcsec)
b_d	FLOAT		Semi-mainor axis of disk (arcsec)
disk_index	FLOAT		Sersic index of disk (1)
dra	FLOAT		RA of disk center (deg)
ddec	FLOAT		Dec of disk center (deg)
agnra	FLOAT		RA of AGN (deg)
agndec	FLOAT		Dec of AGN (deg)
versionID	INT		ID of simulation version: Galaxy_Model.ID
flux_scale_disk	FLOAT		Multiplicative scaling factor to apply to the disk SED

flux_scale_bulge	FLOAT		Multiplicative scaling factor to apply to the bulge SED
flux_scale_agn	FLOAT		Multiplicative scaling factor to apply to the AGN SED
absmag_r	FLOAT		Absolute magnitude in r
type	FLOAT		Type determined from color (u-r?)
mass_stellar	FLOAT		Stellar mass
mass_gas	FLOAT		Gas mass
mass_halo	FLOAT		Halo mass
color_ug	FLOAT		Restframe color u-g
color_gr	FLOAT		Restframe color g-r
color_ri	FLOAT		Restframe color r-i
color_iz	FLOAT		Restframe color i-z
color_zy	FLOAT		Restframe color z-y
isagn	INT		ID of AGN; zero if none present; else 1.
agn_tau	FLOAT		Characteristic time scale (days)
agn_SFinf	FLOAT		RMS variability at long times (mag)
cx	FLOAT	HTMPOS	X Cartesian position
cy	FLOAT	HTMPOS	Y Cartesian position
cz	FLOAT	HTMPOS	Z Cartesian position
pixid	BIGINT	HTMID	ID of pixel
point	SPOINT	gal_point	Spherical point for GIST indexing

Star Table:

Outstanding issues are to pin down units. The apparent magnitudes will be reported as they appear above the atmosphere without galactic extinction.

Star			
Column Name	**Data Type**	**Keys**	**Comments**
ID	INT (BIGINT if catalogs will be larger than 10^9)	Primary	Identifier from star catalog
ra	DOUBLE	POS	Right Ascension (deg)
decl	DOUBLE	POS	Declination (deg)

gal_l	FLOAT		Galactic longitude (deg)
gal_b	FLOAT		Galactic latitude (deg)
versionID	INT		Identifier for catalog run: Star_Model.ID
muRa	FLOAT		Proper motion in RA (milliarcsec/yr)
muDec	FLOAT		Proper motion in DEC (milliarcsec/yr)
Vrad	FLOAT		Radial velocity (km/s)
parallax	FLOAT		Parallax (milliarcsec)
distance	FLOAT		Distance from sun (kpc)
SEDfilename	VARCHAR(25)		Filename of SED for star
SEDID	INT		Identifier of SED: Spectrum_meta.ID
flux_scale	FLOAT		Scaling constant to be applied to the SED
u	FLOAT		Apparent magnitude in u (extincted; std atm)
g	FLOAT		Apparent magnitude in g (extincted; std atm)
r	FLOAT		Apparent magnitude in r (extincted; std atm)
i	FLOAT		Apparent magnitude in i (extincted; std atm)
z	FLOAT		Apparent magnitude in z (extincted; std atm)
y	FLOAT		Apparent magnitude in y (extincted; std atm)
u_sdss	FLOAT		Observed magnitude from SDSS in u (un-extinted; std atm)
g_sdss	FLOAT		Observed magnitude from SDSS in g (un-extinted; std atm)
r_sdss	FLOAT		Observed magnitude from SDSS in r (un-extinted; std atm)
i_sdss	FLOAT		Observed magnitude from SDSS in i (un-extinted; std atm)
z_sdss	FLOAT		Observed magnitude from SDSS in z (un-extinted; std atm)
absmag_r	FLOAT		Absolute magnitude in r
ebv	FLOAT		B-V extinction
espectrumid	INT		Id of reddenning spectrum in spectrum table.

pop	TINYINT		Population (0=Thin Disk, 1=Thick Disk, 2=Halo)
type	TINYINT		Identifier of model type (0=Kurucz, 1=M Dwarf)
T	FLOAT		Surface temperature of the model (K)
feh	FLOAT		Metallicity of the model
logg	FLOAT		log(g) for the model
VR	FLOAT		Velocity in R coordinate (cylindrical)
Vphi	FLOAT		Velocity in phi coordinate (cylindrical)
Vz	FLOAT		Velocity in z coordinate (cylindrical)
isvar	INT		ID of variable source; zero if not variable; isvar = StarVar.ID
timescale	FLOAT		Time scale of variability (days). If the lightcurve is non-periodic, this is understood to be the lightcurve lifetime. Zero if not variable.
varfluxpeak	FLOAT		Amplitude of deviation in magnitude. Zero if not variable.
t0	FLOAT		Time in MJD of beginning of variability.
X	FLOAT		Cartesian coordinate in heliocentric galactic coordinates (pc) +X toward GC
Y	FLOAT		Cartesian coordinate in heliocentric galactic coordinates (pc)
Z	FLOAT		Cartesian coordinate in heliocentric galactic coordinates (pc)
cx	FLOAT	HTMPOS	X position on unit sphere
cy	FLOAT	HTMPOS	Y position on unit sphere
cz	FLOAT	HTMPOS	Z position on unit sphere
pixid	BIGINT	HTMID	HTM pixel identifier
Point	SPOINT	star_pos	Spherical point for GIST indexing

Star_Var Table:
Metadata for a stellar variability. Do we have six file names or do we assume a naming convention?

Star_Var			
Column Name	**Data Type**	**Keys**	**Comments**
ID	INT	Primary	Variability model identifier

isper	BOOLEAN		Is the lightcurve periodic?
filename	VARCHAR(25)		Filename of lightcurve files (u, g, r, i, z, y)
type	INT		Type of variability. Eclipsing Binary=1, Planetary Occultation=2, Flare=3, CV=4, RR Lyrae=5, Lens=6

LightCurve Table:
Light curves for all types of stellar variability.

LightCurve			
Column Name	**Data Type**	**Keys**	**Comments**
ID	INT	typetime	Variability model identifier; Star_Var.ID
BINID	INT		Bin number
t	FLOAT	typetime	Fraction of the period (0-1)
val	FLOAT		Normalized magnitude offset. -1 to 1 for periodic 0 to 1 for nonperiodic

Cosmo_Var Table:
Metadata for a cosmological variability. Do we have six file names or do we assume a naming convention?

Cosmo_Var			
Column Name	**Data Type**	**Keys**	**Comments**
ID	INT	Primary	Variability model identifier
isper	BOOLEAN		Is the lightcurve periodic?
filename	VARCHAR(25)		Filename of lightcurve files (u, g, r, i, z, y)
type	INT		Type of variability. Type Ia supernova=1, Type II supernova=2, GRB=3

Galaxy_Model Table:
Metadata for a catalog generated for the Galaxy table.

Galaxy_Model			
Column Name	**Data Type**	**Keys**	**Comments**
ID	INT	Primary	Identifier of galaxy simulation run
simulation	VARCHAR		Numerical simulation used
opsimrun	VARCHAR		Operation simulator run used
date	DATETIME		Date of catalog creation

specfiles	VARCHAR		Description of spectra files

Star_Model Table:
Metadata for a catalog generated for the Star table.

Star_Model			
Column Name	**Data Type**	**Keys**	**Comments**
ID	INT	Primary	Identifier of galaxy simulation run
mw_model	VARCHAR		Model of Milky Way
lf_file	VARCHAR		Luminosity Function file
stellar_model	VARCHAR		Stellar models
date	DATETIME		Date of catalog creation
specfiles	VARCHAR		Description of stellar spectrum files

Spectrum_meta Table:
Metadata of individual spectra.

Spectrum_meta			
Column Name	**Data Type**	**Keys**	**Comments**
ID	INT	Primary	Identifier of spectrum
model	VARCHAR		Model used for creation
model_params	VARCHAR??		Parameters fed to model
type	TINYINT		0=Star, 1=Galaxy
filename	VARCHAR(25)		Filename of the spectrum
norm_type	TINYINT		Type of normalization. 0=unit integrated flux, 1=unit norm, 2=unit flux at value
norm_lambda	FLOAT		Wavelength at which normalization is performed
normval	FLOAT		Normalization constant
fluxatnorm	FLOAT		Flux value at norm_lambda after normalization