NASA Exoplanet Archive: Planetary Systems (PS) Dataset

DATASET OVERVIEW

Attribute	Description
Dataset Name	NASA Exoplanet Archive - Planetary Systems (PS) Table
Source	NASA Exoplanet Archive (https://exoplanetarchive.ipac.caltech.edu)
Total Records	39,315 rows
Total Columns	289 columns
Data Type	Astronomical/Exoplanetary Data
File Format	CSV

COLUMN DESCRIPTIONS

IDENTIFIERS & NAMES

Column	Data Type	Description
`rowid`	Integer	Unique record identifier
`pl_name`	String	Planet name
`hostname`	String	Host star name
`pl_letter`	String	Planet designation letter (b, c, d...)
`hd_name`	String	Henry Draper Catalog ID
`hip_name`	String	Hipparcos Catalog ID
`tic_id`	String	TESS Input Catalog ID
`gaia_dr2_id`	String	Gaia Data Release 2 ID
`gaia_dr3_id`	String	Gaia Data Release 3 ID

Column	Data Type	Description
default_flag	Integer (0/1)	1 = default/preferred parameter set

Note: Use `default_flag = 1` to get the primary parameters when multiple studies exist for the same planet.

SYSTEM COMPOSITION

Column	Data Type	Description
sy_snum	Integer	Number of stars in system
sy_pnum	Integer	Number of confirmed planets
sy_mnum	Integer	Number of moons
cb_flag	Integer (0/1)	1 = planet orbits binary star system

DISCOVERY INFORMATION

Column	Data Type	Description
discoverymethod	String	Detection method: Radial Velocity, Transit, Imaging, Microlensing, Timing, Astrometry
disc_year	Integer	Discovery year
disc_refname	String	Discovery publication reference
disc_pubdate	String	Publication date
disc_locale	String	Ground or Space-based observation
disc_facility	String	Observatory/facility name
disc_telescope	String	Telescope name
disc_instrument	String	Instrument name

DETECTION FLAGS (0/1)

Column	Description
rv_flag	Detected via radial velocity
tran_flag	Detected via transit method
ima_flag	Detected via direct imaging
micro_flag	Detected via microlensing
ast_flag	Detected via astrometry
pul_flag	Pulsar timing variations
ptv_flag	Pulsation timing variations
obm_flag	Orbital brightness modulation
etv_flag	Eclipse timing variations
dkin_flag	Disk kinematics

SOLUTION STATUS

Column	Data Type	Description
soltype	String	Solution type: "Published Confirmed", "Candidate"
pl_controv_flag	Integer (0/1)	1 = confirmation status questioned
pl_refname	String	Parameter source reference

ORBITAL PARAMETERS

Column	Unit	Description
pl_orbper	Days	Orbital period
pl_orbsmax	AU	Semi-major axis
pl_orbeccen	—	Orbital eccentricity (0=circular)
pl_orbincl	Degrees	Orbital inclination

Error columns: pl_orbpererr1 (upper), pl_orbpererr2 (lower)

PHYSICAL PARAMETERS

Column	Unit	Description
pl_rade	Earth Radii	Planet radius
pl_radj	Jupiter Radii	Planet radius
pl_masse	Earth Masses	Planet mass
pl_massj	Jupiter Masses	Planet mass
pl_msinie	Earth Masses	Minimum mass (M×sin i)
pl_msinij	Jupiter Masses	Minimum mass (M×sin i)
pl_bmasse	Earth Masses	Best mass estimate
pl_bmassj	Jupiter Masses	Best mass estimate
pl_dens	g/cm^3	Planet density
pl_insol	Earth Flux	Insolation flux relative to Earth
pl_eqt	Kelvin	Equilibrium temperature

TRANSIT PARAMETERS (for tran_flag = 1)

Column	Unit	Description
pl_tranmid	Days	Transit midpoint time
pl_trandep	Percent	Transit depth
pl_trandur	Hours	Transit duration
pl_imppar	—	Impact parameter
pl_ratror	—	Planet-to-star radius ratio
pl_ratdor	—	Semi-major axis to stellar radius ratio

STELLAR PARAMETERS

Column	Unit	Description
st_spectype	String	Spectral type
st_teff	Kelvin	Effective temperature
st_rad	Solar Radii	Stellar radius
st_mass	Solar Masses	Stellar mass

Column	Unit	Description
st_met	dex	Metallicity [Fe/H] or [M/H]
st_lum	log(Solar)	Luminosity
st_logg	cm/s^2	Surface gravity
st_age	Gyr	Stellar age
st_dens	g/cm^3	Stellar density
st_vsin	km/s	Rotational velocity
st_rotp	Days	Rotation period

ASTROMETRY & POSITION

Column	Unit	Description
ra	Degrees	Right Ascension
dec	Degrees	Declination
sy_dist	Parsecs	Distance to system
sy_plx	mas	Parallax
sy_pm	mas/yr	Total proper motion

PHOTOMETRY

Column	Filter	Description
sy_bmag	Johnson B	Blue magnitude
sy_vmag	Johnson V	Visual magnitude
sy_jmag	2MASS J	Near-infrared J
sy_hmag	2MASS H	Near-infrared H
sy_kmag	2MASS Ks	Near-infrared Ks
sy_gmag	SDSS g	Sloan g
sy_w1mag	WISE W1	3.4 µm
sy_tmag	TESS	TESS magnitude
sy_kepmag	Kepler	Kepler magnitude

METADATA

Column	Description
rowupdate	Last update date
pl_pubdate	Parameter publication date
releasedate	Archive release date
st_nphot	Number of photometric time series
st_nrvc	Number of radial velocity curves
st_nspec	Number of stellar spectra

CONCLUSION

The NASA Exoplanet Archive Planetary Systems dataset stands as the definitive resource for exoplanet research, offering unparalleled breadth and scientific rigor. Its comprehensive 289-column structure, robust quality controls, and cross-matched identifiers provide a solid foundation for diverse analytical applications—though users must navigate data sparsity and duplicates through proper filtering. For both academic assignments and advanced research, this dataset remains an essential tool for understanding exoplanetary systems and their stellar environments.