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LSST Simulated Solar System Data Products Catalog

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LSST S3 Data Products Catalog

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- Full density simulation of year 1 of LSST

- SSO Populations:
  - S3M (Grav et al. 2011),
  - Granvik NEOs (Granvik et al. 2015)

- Survey Simulation: Feature Based Scheduler v. 1.5

- Survey Simulator: Naidu et al. (JPL)
  - N-body (perturbers: planets + Pluto/Charon)
  - Actual camera footprint (instead of statistical fill factor)
  - Trailing losses
  - "Fading"/statistical detection cutoff
  - Observation uncertainties (RA, Dec, Filtermag)
  - SSO spectral types: S, C (Ivesić et al. 2001, Vereš & Chesley 2017)
  - False detections: DIA & CCD noise (Jones et al. 2017, Vereš & Chesley 2017)

LSST S3 Data Products Catalog

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- Full density data base (~ 120GB) available through SSSC Jupyter Hub
- LSST DB Schema here
- Current version: 0.0.1 (pre-alpha)
- DB will be continuously updated

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LSST Synthetic Solar System Data Products Catalog Access

This notebook demonstrates how to access the S3DPC database in a Jupyter notebook.

In [1]:
```
import pymysql
import pandas as pd
```

Connect to the database.

In [2]:
```
db = pymysql.connect(host='db.dirac.institute',
                     user='public',
                     db='lsst')
```

Display database tables

In [3]:
```
cursor = db.cursor()
cursor.execute("""SHOW tables""")
tables=cursor.fetchall()
print(tables)
```

```
(('DIASource',), ('MPCORB',))
```

Define row range and import into pandas DataFrame.

In [4]:
```
rows_start=0
nrows=100

orbits = pd.read_sql("""SELECT * FROM """ + tables[1][0]+""" LIMIT """+str(rows_start)+','+str(nrows), db)
```

In [5]:
```
orbits
```

Out[5]:

	mpcDesignation	mpcNumber	ssObjectId	mpcH	mpcG	epoch	tPeri	peri	node	incl	...	arc	arcStart	arcEnd	rms
0	SR000001a	None	6211014671169660924	7.95	0.15	54800.0	52354.06796	47.02487	66.70177	5.01607	...	None	None	None	None
1	SR000002a	None	8276175278491977536	11.90	0.15	54800.0	54255.95952	111.14332	149.76906	12.20203	...	None	None	None	None
2	SR000003a	None	6347009961528796392	7.58	0.15	54800.0	32718.27775	86.93460	157.72377	16.23096	...	None	None	None	None
3	SR000004a	None	6925471435483732468	12.99	0.15	54800.0	49162.23730	357.05184	318.01916	10.94138	...	None	None	None	None
4	SR000006a	None	587638174656711606	9.28	0.15	54800.0	-13278.77515	302.03901	292.49508	18.91729	...	None	None	None	None
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..

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What is missing?

- Additional / Updated Populations (ISOs, Comets, OSS) + SEDs
- LSST only orbit/color fitting
- Linking losses

Questions?