



HMpTy Documentation

Release v1.5.5

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Generate Hierarchical Triangular Mesh (HTM) IDs, crossmatch sets of sky-coordinates and more.



Documentation for HMpTy is hosted by [Read the Docs](#) ([development version](#) and [master version](#)). The code lives on [github](#). Please report any issues you find [here](#).

FEATURES

-

1.1 Installation

The easiest way to install HMpTy is to use `pip` (here we show the install inside of a conda environment):

```
conda create -n HMpTy python=3.7 pip
conda activate HMpTy
pip install HMpTy
```

Or you can clone the [github repo](#) and install from a local version of the code:

```
git clone git@github.com:thespacedoctor/HMpTy.git
cd HMpTy
python setup.py install
```

To upgrade to the latest version of HMpTy use the command:

```
pip install HMpTy --upgrade
```

To check installation was successful run `HMpTy -v`. This should return the version number of the install.

1.1.1 Development

If you want to tinker with the code, then install in development mode. This means you can modify the code from your cloned repo:

```
git clone git@github.com:thespacedoctor/HMpTy.git
cd HMpTy
python setup.py develop
```

[Pull requests](#) are welcomed!

1.2 Initialisation

Before using HMpTy you need to use the `init` command to generate a user settings file. Running the following creates a `yaml` settings file in your home folder under `~/ .config/HMpTy/HMpTy.yaml`:

```
HMpTy init
```

The file is initially populated with HMpTy's default settings which can be adjusted to your preference.

If at any point the user settings file becomes corrupted or you just want to start afresh, simply trash the `HMpTy.yaml` file and rerun `HMpTy init`.

1.2.1 Modifying the Settings

Once created, open the settings file in any text editor and make any modifications needed.

1.2.2 Basic Python Setup

If you plan to use `hmpty` in your own scripts you will first need to parse your settings file and set up logging etc. One quick way to do this is to use the `fundamentals` package to give you a logger, a settings dictionary and a database connection (if connection details given in settings file):

```
## SOME BASIC SETUP FOR LOGGING, SETTINGS ETC
from fundamentals import tools
from os.path import expanduser
home = expanduser("~")
settingsFile = home + "/.config/hmpty/hmpty.yaml"
su = tools(
    arguments={"settingsFile": settingsFile},
    docString=__doc__,
)
arguments, settings, log, dbConn = su.setup()
```

1.3 Command-Line Tutorial

1.3.1 Indexing Database Tables with HTMids

HMpTy can be used from the command-line to add Hierarchical Triangular Mesh (HTM) IDs to any database table that has populated equatorial coordinate columns.

To generate and populate the `htm10ID`, `htm13ID` and `htm16ID` columns on a table run either:

```
hmpty index transientBucket primaryKeyId raDeg decDeg -s /path/to/my-settings.yaml
```

where the settings file contains the database credentials:

database settings:

```
db: mydatabase
host: localhost
user: myusername
password: mypass
```

Or alternatively you can pass the credentials in directory via the command-line (less secure obviously):

```
hmpty index transientBucket primaryKeyId raDeg decDeg --host localhost --user_
↳ myusername --passwd mypass --dbName mydatabase
```

1.3.2 Conesearching Database Tables

It's possible to perform a conesearch on a database table (with existing HTMLid columns pre-populated) from the command-line.

The syntax for the `cl-conesearch` is:

```
hmpty search <tableName> <raCol> <decCol> <ra> <dec> <radius> (-s <pathToSettingsFile>
↳ | --host <host> --user <user> --passwd <passwd> --dbName <dbName>)
```

So to perform a 10 arcsec conesearch on a *transientBucket* table with *ra* and *dec* columns named *raDeg* and *decDeg* respectively around the coordinates “21:19:41.31”, “+21:57:56.3”:

```
hmpty search transientBucket raDeg decDeg 21:19:41.31 +21:57:56.3 10. -s /path/to/my-
↳ settings.yaml
```

```
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| decDegErr | hostRedshiftType | decDeg | masterIDFlag | telescope |
↳ | lastNonDetectionDate | sherlockClassification | discoveryPhase |
↳ | dateLastModified | cy | cx | dateLastRead |
↳ | transientTypePredicationSource | dateDeleted | tripletImageUrl
↳ | | transientTypePrediction | surveyObjectUrl
↳ | | html10ID | targetImageUrl
↳ |
↳ | | primaryKeyId | raDeg | instrument | hostRedshift
↳ | filter | finderImageUrl | html13ID | subtractedImageUrl | transientRedshift
↳ | raDegErr | dateCreated | cmSepArcsec | observationDate | classificationPhase
↳ | observationMJD | transientBucketId | name | transientRedshiftNotes |
↳ | classificationWRTMax | tmpFlag | cz | referenceImageUrl
```

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1.3. Command-Line Tutorial

```
↳ | reducer | html16ID | lastNonDetectionMJD | magnitude | survey
↳ | magnitudeError | limitingMag | replacedByRowId | htm20ID
↳ | spectralType | lightcurveURL |
```

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			21.9656	1			2016-09-30	2016-09-25
		SN						-0.
5971	0.7096							
		http://wis-tns.weizmann.ac.il/object/2016grk						
13458566								
							1387901	
319.9221				Clear-			861348238	
						2016-09-30	0.0043	
2016-09-30				57661.2291		1387901		
AT2016grk								0.3741
							55126287254	
		18.7000	POSS				0	
0		14112329537188						
			21.9656	0				
						2016-10-01		-0.
5971	0.7096							
https://c4.staticflickr.com/6/5313/29951445811_cf5c76e8aa_o.jpg SN								
		http://www.rochesterastronomy.org/supernova.html#2016grk						
13458566								
							1392947	
319.9221							861348238	
						2016-10-01	0.0043	
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5971	0.7096							
		http://psweb.mp.qub.ac.uk/sne/atlas3/candidate/1211941281215756900/						
13458566								
							1398488	
319.9220				c			861348238	
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2016-09-30				57661.3788		1387901		
ATLAS16dbz								0.3741
							55126287254	
		17.7500	ATLAS			0.0700		
0		14112329537190						

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```

|                | 21.9657 | 0                | 2016-10-01 | -0.
→5971 | 0.7096 |                |                |
→                | http://psweb.mp.qub.ac.uk/sne/atlas3/candidate/1211941281215756900/ |
→13458566 |                |                | 1398490                |
→319.9220 |                | c                | 861348238 |
→                |                | 2016-10-01 | 0.6391 |
→2016-09-30 |                | 57661.4019 | 1387901 |
→ATLAS16dbz |                |                | 0.3741 |
→|
→                |                | 55126287255 |
→                | 17.9400 | ATLAS                | 0.0800 | 0 |
→0                | 14112329537309 |                |
|                | 21.9658 | 0                | 2016-10-01 | -0.
→5971 | 0.7096 |                |                |
→                | orphan
→                |
→13458566 | http://psweb.mp.qub.ac.uk/sne/atlas3/site_media/images/data/atlas3//
→57661/1211941281215756900_57661.401_02a57661o0355c_8445_target.jpeg | 1398485
→| 319.9220 |                | c                | 861348238 |
→|                |                | 2016-10-01 | 0.6537 |
→| 2016-09-30 |                | 57661.3495 | 1387901 |
→ATLAS16dbz |                |                | 0.3741 |
→| http://psweb.mp.qub.ac.uk/sne/atlas3/site_media/images/data/atlas3//57661/
→1211941281215756900_57661.401_02a57661o0355c_8445_ref.jpeg |
→55126287255 |                | 17.8800 | ATLAS                |
→| 0                | 0                | 14112329537309 |
→|
|                | 21.9658 | 0                | 2016-10-01 | -0.
→5971 | 0.7096 |                |                |
→                |
→                | http://psweb.mp.qub.ac.uk/sne/atlas3/candidate/1211941281215756900/ |
→13458566 |                |                | 1398489                |
→319.9220 |                | c                | 861348238 |
→                |                | 2016-10-01 | 0.6893 |
→2016-09-30 |                | 57661.3588 | 1387901 |
→ATLAS16dbz |                |                | 0.3741 |
→|
→                |                | 55126287254 |
→                | 17.8000 | ATLAS                | 0.0700 | 0 |
→0                | 14112329537198 |                |
|                | 21.9658 | 0                | 2016-10-01 | -0.
→5971 | 0.7096 |                |                |
→                |
→                | http://psweb.mp.qub.ac.uk/sne/atlas3/candidate/1211941281215756900/ |
→13458566 |                |                | 1398486                |
→319.9220 |                | c                | 861348238 |
→                |                | 2016-10-01 | 0.7532 |
→2016-09-30 |                | 57661.3679 | 1387901 |
→ATLAS16dbz |                |                | 0.3741 |
→|
→                |                | 55126287254 |
→                | 17.8600 | ATLAS                | 0.0700 | 0 |
→0                | 14112329537185 |                |

```

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```

|                |                | 21.9657 | 0                |                |                |
→                |                |                |                | 2016-10-01        |                | -0.
→5971 | 0.7096 |                |                |                |                |
→                |                |                |                |                |                |
→                | http://psweb.mp.qub.ac.uk/sne/atlas3/candidate/1211941281215756900/ |
→13458566 |                |                |                |                |                |
→                |                |                |                | 1398487            |                |
→319.9219 |                |                | c                |                | 861348238        |
→                |                |                |                | 2016-10-01        | 0.8138           |
→2016-09-30 |                |                | 57661.3494        | 1387901            |                |
→ATLAS16dbz |                |                |                |                |                | 0.3741
→|
→                |                |                |                | 55126287255        |
→                | 17.8800 | ATLAS                | 0.0700            | 0                  |
→0                | 14112329537311 |                |                |                |
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```

Note RA and DEC can be in either sexagesimal or decimal degree formats.

Again, you can instead pass in the database credentials via the

command-line instead of a settings file:

```

hmpy search transientBucket raDeg decDeg 319.92212 21.96564 10. --host localhost --
→user myusername --passwd mypass --dbName mydatabase

```

1.4 Renders

To render the results of the conesearch as json, csv, yaml or markdown

use the `-r <format>` flag. For example:

```

hmpy search transientBucket raDeg decDeg 21:19:41.31 +21:57:56.3 10. -s /path/to/my-
→settings.yaml -r json

```

```

[
  {
    "classificationPhase": null,
    "classificationWRTMax": null,
    "cmSepArcsec": 0.0043467057710126393,
    "cx": 0.709625112642,

```

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```

"cy": -0.597091649225,
"cz": 0.374050480461,
"dateCreated": "20160930t192332",
"dateDeleted": null,
"dateLastModified": "20160930t192332",
"dateLastRead": null,
"decDeg": 21.9656388889,
"decDegErr": null,
"discoveryPhase": null,
"filter": "Clear-",
"finderImageUrl": null,
"hostRedshift": null,
....

```

It's possible to also render the results as MySQL insert statements, but the name of the table to insert the result into is also needed.

```

hmpy search transientBucket raDeg decDeg 21:19:41.31 +21:57:56.3 10. -s /path/to/my-
  settings.yaml -r mysql my_results

```

```

INSERT INTO `my_results` (classificationPhase,classificationWRTMax,cmSepArcsec,cx,cy,
  cz,dateCreated,dateDeleted,dateLastModified,dateLastRead,decDeg,decDegErr,
  discoveryPhase,filter,finderImageUrl,hostRedshift,hostRedshiftType,htm10ID,htm13ID,
  htm16ID,htm20ID,instrument,lastNonDetectionDate,lastNonDetectionMJD,lightcurveURL,
  limitingMag,magnitude,magnitudeError,masterIDFlag,name,observationDate,
  observationMJD,primaryKeyId,raDeg,raDegErr,reducer,referenceImageUrl,
  replacedByRowId,sherlockClassification,spectralType,subtractedImageUrl,survey,
  surveyObjectUrl,targetImageUrl,telescope,tmpFlag,transientBucketId,
  transientRedshift,transientRedshiftNotes,transientTypePredicationSource,
  transientTypePrediction,tripletImageUrl) VALUES (null,null,"0.00434670577101",
  "0.709625112642", "-0.597091649225", "0.374050480461", "2016-09-30 19:23:32", null,
  "2016-09-30 19:23:32", null, "21.9656388889", null, null, "Clear-", null, null,
  null, "13458566", "861348238", "55126287254", "14112329537188", null, "2016-09-25
  05:16:07", null, null, "0", "18.7", null, "1", "AT2016grk", "2016-09-30 05:29:57",
  "57661.2291319", "1387901", "319.922125", null, null, null, "0", "SN", null, null,
  "POSS", "http://wis-tns.weizmann.ac.il/object/2016grk", null, null, null, "1387901",
  null, null, null, null, null) ON DUPLICATE KEY UPDATE classificationPhase=null,
  classificationWRTMax=null, cmSepArcsec="0.00434670577101", cx="0.709625112642", cy=
  "-0.597091649225", cz="0.374050480461", dateCreated="2016-09-30 19:23:32",
  dateDeleted=null, dateLastModified="2016-09-30 19:23:32", dateLastRead=null, decDeg=
  "21.9656388889", decDegErr=null, discoveryPhase=null, filter="Clear-",
  finderImageUrl=null, hostRedshift=null, hostRedshiftType=null, htm10ID="13458566",
  htm13ID="861348238", htm16ID="55126287254", htm20ID="14112329537188",
  instrument=null, lastNonDetectionDate="2016-09-25 05:16:07",
  lastNonDetectionMJD=null, lightcurveURL=null, limitingMag="0", magnitude="18.7",
  magnitudeError=null, masterIDFlag="1", name="AT2016grk", observationDate="2016-09-
  30 05:29:57", observationMJD="57661.2291319", primaryKeyId="1387901", raDeg="319.
  922125", raDegErr=null, reducer=null, referenceImageUrl=null, replacedByRowId="0",
  sherlockClassification="SN", spectralType=null, subtractedImageURL=null, survey=
  "POSS", surveyObjectUrl="http://wis-tns.weizmann.ac.il/object/2016grk",
  targetImageUrl=null, telescope=null, tmpFlag=null, transientBucketId="1387901",
  transientRedshift=null, transientRedshiftNotes=null,
  transientTypePredicationSource=null, transientTypePrediction=null,
  tripletImageUrl=null, updated=IF( classificationPhase=null AND
  classificationWRTMax is null AND cmSepArcsec="0.00434670577101" AND cx="0.
  709625112642" AND cy="-0.597091649225" AND cz="0.374050480461" AND dateCreated=
  "2016-09-30 19:23:32" AND dateDeleted is null AND dateLastModified="2016-09-30
  19:23:32" AND dateLastRead is null AND decDeg="21.9656388889" AND decDegErr is
  null AND discoveryPhase is null AND filter="Clear-" AND finderImageUrl is null
  AND hostRedshift is null AND hostRedshiftType is null AND htm10ID="13458566" AND
  htm13ID="861348238" AND htm16ID="55126287254" AND htm20ID="14112329537188" AND
  instrument is null AND lastNonDetectionDate="2016-09-25 05:16:07" AND
  lastNonDetectionMJD is null AND lightcurveURL is null AND limitingMag="0" AND
  magnitude="18.7" AND magnitudeError is null AND masterIDFlag="1" AND name="AT2016grk"
  AND observationDate="2016-09-30 05:29:57" AND observationMJD="57661.2291319" AND
  primaryKeyId="1387901" AND raDeg="319.922125" AND raDegErr is null AND reducer is
  null AND referenceImageUrl is null AND replacedByRowId="0" AND sherlockClassification="SN"
  AND spectralType is null AND subtractedImageURL is null AND survey="POSS" AND
  surveyObjectUrl="http://wis-tns.weizmann.ac.il/object/2016grk" AND targetImageUrl is
  null AND telescope is null AND tmpFlag is null AND transientBucketId="1387901" AND
  transientRedshift is null AND transientRedshiftNotes is null AND transientTypePredicationSource is
  null AND transientTypePrediction is null AND tripletImageUrl is null)

```

1.4. Renders

→ 597091649225" AND cz="0.374050480461" AND dateCreated="2016-10-01 06:29:16" AND (continues on next page)

→ "21.96577" AND decDegErr is null AND discoveryPhase is null AND filter = 0 AND (continues on next page)

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```

INSERT INTO `my_results` (classificationPhase,classificationWRTMax,cmSepArcsec,cx,cy,
→cz,dateCreated,dateDeleted,dateLastModified,dateLastRead,decDeg,decDegErr,
→discoveryPhase,filter,finderImageUrl,hostRedshift,hostRedshiftType,html0ID,html13ID,
→html16ID,htm20ID,instrument,lastNonDetectionDate,lastNonDetectionMJD,lightcurveURL,
→limitingMag,magnitude,magnitudeError,masterIDFlag,name,observationDate,
→observationMJD,primaryKeyId,raDeg,raDegErr,reducer,referenceImageUrl,
→replacedByRowId,sherlockClassification,spectralType,subtractedImageUrl,survey,
→surveyObjectUrl,targetImageUrl,telescope,tmpFlag,transientBucketId,
→transientRedshift,transientRedshiftNotes,transientTypePredicationSource,
→transientTypePrediction,tripletImageUrl) VALUES (null,null,"0.639098796909","0.
→709622938008","-0.597093309838","0.374051955215","2016-10-01 19:12:26",null,
→"2016-10-01 19:12:26",null,"21.96573",null,null,"c",null,null,null,
→"13458566","861348238","55126287255","14112329537309",null,null,null,null,"0
→","17.94","0.08","0","ATLAS16dbz","2016-09-30 09:38:41","57661.4018678",
→"1398490","319.92196",null,null,null,"0",null,null,null,"ATLAS","http://
→psweb.mp.qub.ac.uk/sne/atlas3/candidate/1211941281215756900/",null,null,null,
→"1387901",null,null,null,null,null) ON DUPLICATE KEY UPDATE
→classificationPhase=null, classificationWRTMax=null, cmSepArcsec="0.639098796909",
→cx="0.709622938008", cy="-0.597093309838", cz="0.374051955215", dateCreated="2016-
→10-01 19:12:26", dateDeleted=null, dateLastModified="2016-10-01 19:12:26",
→dateLastRead=null, decDeg="21.96573", decDegErr=null, discoveryPhase=null, filter="c
→", finderImageUrl=null, hostRedshift=null, hostRedshiftType=null, html0ID="13458566
→", htm13ID="861348238", htm16ID="55126287255", htm20ID="14112329537309",
→instrument=null, lastNonDetectionDate=null, lastNonDetectionMJD=null,
→lightcurveURL=null, limitingMag="0", magnitude="17.94", magnitudeError="0.08",
→masterIDFlag="0", name="ATLAS16dbz", observationDate="2016-09-30 09:38:41",
→observationMJD="57661.4018678", primaryKeyId="1398490", raDeg="319.92196",
→raDegErr=null, reducer=null, referenceImageUrl=null, replacedByRowId="0",
→sherlockClassification=null, spectralType=null, subtractedImageUrl=null, survey=
→"ATLAS", surveyObjectUrl="http://psweb.mp.qub.ac.uk/sne/atlas3/candidate/
→1211941281215756900/", targetImageUrl=null, telescope=null, tmpFlag=null,
→transientBucketId="1387901", transientRedshift=null, transientRedshiftNotes=null,
→transientTypePredicationSource=null, transientTypePrediction=null,
→tripletImageUrl=null, updated=IF( classificationPhase=null AND
→classificationWRTMax is null AND cmSepArcsec="0.639098796909" AND cx="0.
→709622938008" AND cy="-0.597093309838" AND cz="0.374051955215" AND dateCreated=
→"2016-10-01 19:12:26" AND dateDeleted is null AND dateLastModified="2016-10-01
→19:12:26" AND dateLastRead is null AND decDeg="21.96573" AND decDegErr is null
→AND discoveryPhase is null AND filter="c" AND finderImageUrl is null AND
→hostRedshift is null AND hostRedshiftType is null AND html0ID="13458566" AND
→htm13ID="861348238" AND htm16ID="55126287255" AND htm20ID="14112329537309" AND
→instrument is null AND lastNonDetectionDate is null AND lastNonDetectionMJD is
→null AND lightcurveURL is null AND limitingMag="0" AND magnitude="17.94" AND
→magnitudeError="0.08" AND masterIDFlag="0" AND name="ATLAS16dbz" AND
→observationDate="2016-09-30 09:38:41" AND observationMJD="57661.4018678" AND
→primaryKeyId="1398490" AND raDeg="319.92196" AND raDegErr is null AND reducer is
→null AND referenceImageUrl is null AND replacedByRowId="0" AND
→sherlockClassification is null AND spectralType is null AND subtractedImageUrl is
→null AND survey="ATLAS" AND surveyObjectUrl="http://psweb.mp.qub.ac.uk/sne/atlas3/
→candidate/1211941281215756900/" AND targetImageUrl is null AND telescope is null
→AND tmpFlag is null AND transientBucketId="1387901" AND transientRedshift is
→null AND transientRedshiftNotes is null AND transientTypePredicationSource is
→null AND transientTypePrediction is null AND tripletImageUrl=null, 0, 1),
→dateLastModified=IF( classificationPhase=null AND classificationWRTMax is null AND
→cmSepArcsec="0.639098796909" AND cx="0.709622938008" AND cy="-0.597093309838"
→AND cz="0.374051955215" AND dateCreated="2016-10-01 19:12:26" AND dateDeleted is
→null AND dateLastModified="2016-10-01 19:12:26" AND dateLastRead is null AND
→decDeg="21.96573" AND decDegErr is null AND discoveryPhase is null AND
→" AND finderImageUrl is null AND hostRedshift is null AND hostRedshiftType is
→null AND html0ID="13458566" AND htm13ID="861348238" AND htm16ID="55126287255"
→AND htm20ID="14112329537309" AND instrument is null AND lastNonDetectionDate is
→null AND lastNonDetectionMJD is null AND lightcurveURL is null AND limitingMag="0
→" AND magnitude="17.94" AND magnitudeError="0.08" AND masterIDFlag="0" AND name=
→"ATLAS16dbz" AND observationDate="2016-09-30 09:38:41" AND observationMJD="57661.
→4018678" AND primaryKeyId="1398490" AND raDeg="319.92196" AND raDegErr="0" AND
→reducer="0" AND referenceImageUrl="http://psweb.mp.qub.ac.uk/sne/atlas3/candidate/
→1211941281215756900/" AND subtractedImageUrl="http://psweb.mp.qub.ac.uk/sne/atlas3/
→candidate/1211941281215756900/" AND targetImageUrl="http://psweb.mp.qub.ac.uk/sne/atlas3/
→candidate/1211941281215756900/" AND telescope="ATLAS" AND tmpFlag="0" AND
→transientBucketId="1387901" AND transientRedshift="0" AND transientRedshiftNotes=
→"0" AND transientTypePredicationSource="0" AND transientTypePrediction="0" AND
→tripletImageUrl="http://psweb.mp.qub.ac.uk/sne/atlas3/candidate/1211941281215756900/
→")

```


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INSERT INTO `my_results` (classificationPhase,classificationWRTMax,cmSepArcsec,cx,cy,
→cz,dateCreated,dateDeleted,dateLastModified,dateLastRead,decDeg,decDegErr,
→discoveryPhase,filter,finderImageUrl,hostRedshift,hostRedshiftType,html0ID,html13ID,
→html6ID,htm20ID,instrument,lastNonDetectionDate,lastNonDetectionMJD,lightcurveURL,
→limitingMag,magnitude,magnitudeError,masterIDFlag,name,observationDate,
→observationMJD,primaryKeyId,raDeg,raDegErr,reducer,referenceImageUrl,
→replacedByRowId,sherlockClassification,spectralType,subtractedImageUrl,survey,
→surveyObjectUrl,targetImageUrl,telescope,tmpFlag,transientBucketId,
→transientRedshift,transientRedshiftNotes,transientTypePredicationSource,
→transientTypePrediction,tripletImageUrl) VALUES (null,null,"0.653735010571", "0.
→709623008285", "-0.597092861276", "0.374052537922", "2016-10-01 19:12:26", null,
→"2016-10-01 19:12:26", null, "21.965766", null, null, "c", null, null, null,
→"13458566", "861348238", "55126287255", "14112329537309", null, null, null, null, "0
→", "17.88", null, "0", "ATLAS16dbz", "2016-09-30 08:23:12", "57661.34945", "1398485
→", "319.921984", null, null, "http://psweb.mp.qub.ac.uk/sne/atlas3/site_media/
→images/data/atlas3//57661/1211941281215756900_57661.401_02a57661o0355c_8445_ref.jpeg
→", "0", null, null, null, "ATLAS", null, "http://psweb.mp.qub.ac.uk/sne/atlas3/site_
→media/images/data/atlas3//57661/1211941281215756900_57661.401_02a57661o0355c_8445_
→target.jpeg", null, null, "1387901", null, null, null, "orphan", null) ON
→DUPLICATE KEY UPDATE classificationPhase=null, classificationWRTMax=null,
→cmSepArcsec="0.653735010571", cx="0.709623008285", cy="-0.597092861276", cz="0.
→374052537922", dateCreated="2016-10-01 19:12:26", dateDeleted=null,
→dateLastModified="2016-10-01 19:12:26", dateLastRead=null, decDeg="21.965766",
→decDegErr=null, discoveryPhase=null, filter="c", finderImageUrl=null,
→hostRedshift=null, hostRedshiftType=null, html0ID="13458566", html13ID="861348238",
→html6ID="55126287255", htm20ID="14112329537309", instrument=null,
→lastNonDetectionDate=null, lastNonDetectionMJD=null, lightcurveURL=null,
→limitingMag="0", magnitude="17.88", magnitudeError=null, masterIDFlag="0", name=
→"ATLAS16dbz", observationDate="2016-09-30 08:23:12", observationMJD="57661.34945",
→primaryKeyId="1398485", raDeg="319.921984", raDegErr=null, reducer=null,
→referenceImageUrl="http://psweb.mp.qub.ac.uk/sne/atlas3/site_media/images/data/
→atlas3//57661/1211941281215756900_57661.401_02a57661o0355c_8445_ref.jpeg",
→replacedByRowId="0", sherlockClassification=null, spectralType=null,
→subtractedImageUrl=null, survey="ATLAS", surveyObjectUrl=null, targetImageUrl=
→"http://psweb.mp.qub.ac.uk/sne/atlas3/site_media/images/data/atlas3//57661/
→1211941281215756900_57661.401_02a57661o0355c_8445_target.jpeg", telescope=null,
→tmpFlag=null, transientBucketId="1387901", transientRedshift=null,
→transientRedshiftNotes=null, transientTypePredicationSource=null,
→transientTypePrediction="orphan", tripletImageUrl=null, updated=IF(
→classificationPhase=null AND classificationWRTMax is null AND cmSepArcsec="0.
→653735010571" AND cx="0.709623008285" AND cy="-0.597092861276" AND cz="0.
→374052537922" AND dateCreated="2016-10-01 19:12:26" AND dateDeleted is null AND
→dateLastModified="2016-10-01 19:12:26" AND dateLastRead is null AND decDeg="21.
→965766" AND decDegErr is null AND discoveryPhase is null AND filter="c" AND
→finderImageUrl is null AND hostRedshift is null AND hostRedshiftType is null AND
→html0ID="13458566" AND html13ID="861348238" AND html6ID="55126287255" AND htm20ID=
→"14112329537309" AND instrument is null AND lastNonDetectionDate is null AND
→lastNonDetectionMJD is null AND lightcurveURL is null AND limitingMag="0" AND
→magnitude="17.88" AND magnitudeError is null AND masterIDFlag="0" AND name=
→"ATLAS16dbz" AND observationDate="2016-09-30 08:23:12" AND observationMJD="57661.
→34945" AND primaryKeyId="1398485" AND raDeg="319.921984" AND raDegErr is null
→AND reducer is null AND referenceImageUrl="http://psweb.mp.qub.ac.uk/sne/atlas3/
→site_media/images/data/atlas3//57661/1211941281215756900_57661.401_02a57661o0355c_
→8445_ref.jpeg" AND replacedByRowId="0" AND sherlockClassification is null AND
→spectralType is null AND subtractedImageUrl is null AND survey="ATLAS" AND
→surveyObjectUrl is null AND targetImageUrl="http://psweb.mp.qub.ac.uk/sne/atlas3/
→site_media/images/data/atlas3//57661/1211941281215756900_57661.401_02a57661o0355c_
→8445_target.jpeg" AND telescope is null AND tmpFlag is null AND
→transientBucketId="1387901" AND transientRedshift is null AND
→transientRedshiftNotes is null AND transientTypePredicationSource is null AND
→transientTypePrediction="orphan" AND tripletImageUrl=null, 0, 1),

```

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1.4. Renders

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```

→transientTypePrediction="orphan" AND tripletImageUrl=null, 0, 1),
→dateLastModified=IF( classificationPhase=null AND classificationWRTMax is null AND
→cmSepArcsec="0.653735010571" AND cx="0.709623008285" AND cy="-0.597092861276"
→AND cz="0.374052537922" AND dateCreated="2016-10-01 19:12:26" AND dateDeleted is

```

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```

INSERT INTO `my_results` (classificationPhase,classificationWRTMax,cmSepArcsec,cx,cy,
→cz,dateCreated,dateDeleted,dateLastModified,dateLastRead,decDeg,decDegErr,
→discoveryPhase,filter,finderImageUrl,hostRedshift,hostRedshiftType,html0ID,html13ID,
→html16ID,htm20ID,instrument,lastNonDetectionDate,lastNonDetectionMJD,lightcurveURL,
→limitingMag,magnitude,magnitudeError,masterIDFlag,name,observationDate,
→observationMJD,primaryKeyId,raDeg,raDegErr,reducer,referenceImageUrl,
→replacedByRowId,sherlockClassification,spectralType,subtractedImageUrl,survey,
→surveyObjectUrl,targetImageUrl,telescope,tmpFlag,transientBucketId,
→transientRedshift,transientRedshiftNotes,transientTypePredicationSource,
→transientTypePrediction,tripletImageUrl) VALUES (null,null,"0.689312710877", "0.
→709623267865", "-0.597092106613", "0.37405325012", "2016-10-01 19:12:26", null,
→"2016-10-01 19:12:26", null, "21.96581", null, null, "c", null, null, null,
→"13458566", "861348238", "55126287254", "14112329537198", null, null, null, null, "0
→", "17.8", "0.07", "0", "ATLAS16dbz", "2016-09-30 08:36:38", "57661.3587675",
→"1398489", "319.92203", null, null, null, "0", null, null, null, "ATLAS", "http://
→psweb.mp.qub.ac.uk/sne/atlas3/candidate/1211941281215756900/", null, null, null,
→"1387901", null, null, null, null, null) ON DUPLICATE KEY UPDATE
→classificationPhase=null, classificationWRTMax=null, cmSepArcsec="0.689312710877",
→cx="0.709623267865", cy="-0.597092106613", cz="0.37405325012", dateCreated="2016-10-
→01 19:12:26", dateDeleted=null, dateLastModified="2016-10-01 19:12:26",
→dateLastRead=null, decDeg="21.96581", decDegErr=null, discoveryPhase=null, filter="c
→", finderImageUrl=null, hostRedshift=null, hostRedshiftType=null, html0ID="13458566
→", htm13ID="861348238", htm16ID="55126287254", htm20ID="14112329537198",
→instrument=null, lastNonDetectionDate=null, lastNonDetectionMJD=null,
→lightcurveURL=null, limitingMag="0", magnitude="17.8", magnitudeError="0.07",
→masterIDFlag="0", name="ATLAS16dbz", observationDate="2016-09-30 08:36:38",
→observationMJD="57661.3587675", primaryKeyId="1398489", raDeg="319.92203",
→raDegErr=null, reducer=null, referenceImageUrl=null, replacedByRowId="0",
→sherlockClassification=null, spectralType=null, subtractedImageUrl=null, survey=
→"ATLAS", surveyObjectUrl="http://psweb.mp.qub.ac.uk/sne/atlas3/candidate/
→1211941281215756900/", targetImageUrl=null, telescope=null, tmpFlag=null,
→transientBucketId="1387901", transientRedshift=null, transientRedshiftNotes=null,
→transientTypePredicationSource=null, transientTypePrediction=null,
→tripletImageUrl=null, updated=IF( classificationPhase=null AND
→classificationWRTMax is null AND cmSepArcsec="0.689312710877" AND cx="0.
→709623267865" AND cy="-0.597092106613" AND cz="0.37405325012" AND dateCreated=
→"2016-10-01 19:12:26" AND dateDeleted is null AND dateLastModified="2016-10-01
→19:12:26" AND dateLastRead is null AND decDeg="21.96581" AND decDegErr is null
→AND discoveryPhase is null AND filter="c" AND finderImageUrl is null AND
→hostRedshift is null AND hostRedshiftType is null AND html0ID="13458566" AND
→htm13ID="861348238" AND htm16ID="55126287254" AND htm20ID="14112329537198" AND
→instrument is null AND lastNonDetectionDate is null AND lastNonDetectionMJD is
→null AND lightcurveURL is null AND limitingMag="0" AND magnitude="17.8" AND
→magnitudeError="0.07" AND masterIDFlag="0" AND name="ATLAS16dbz" AND
→observationDate="2016-09-30 08:36:38" AND observationMJD="57661.3587675" AND
→primaryKeyId="1398489" AND raDeg="319.92203" AND raDegErr is null AND reducer is
→null AND referenceImageUrl is null AND replacedByRowId="0" AND
→sherlockClassification is null AND spectralType is null AND subtractedImageUrl is
→null AND survey="ATLAS" AND surveyObjectUrl="http://psweb.mp.qub.ac.uk/sne/atlas3/
→candidate/1211941281215756900/" AND targetImageUrl is null AND telescope is null
→AND tmpFlag is null AND transientBucketId="1387901" AND transientRedshift is
→null AND transientRedshiftNotes is null AND transientTypePredicationSource is
→null AND transientTypePrediction is null AND tripletImageUrl=null, 0, 1),
→dateLastModified=IF( classificationPhase=null AND classificationWRTMax is null AND
→cmSepArcsec="0.689312710877" AND cx="0.709623267865" AND cy="-0.597092106613"
→AND cz="0.37405325012" AND dateCreated="2016-10-01 19:12:26" AND dateDeleted is
→null AND dateLastModified="2016-10-01 19:12:26" AND dateLastRead is null AND
→decDeg="21.96581" AND decDegErr is null AND discoveryPhase is null AND
→" AND finderImageUrl is null AND hostRedshift is null AND hostRedshiftType is
→null AND html0ID="13458566" AND htm13ID="861348238" AND htm16ID="55126287254"
→AND htm20ID="14112329537198" AND instrument is null AND lastNonDetectionDate is
→null AND lastNonDetectionMJD is null AND lightcurveURL is null AND limitingMag="0
→" AND magnitude="17.8" AND magnitudeError="0.07" AND masterIDFlag="0" AND name=
→"ATLAS16dbz" AND observationDate="2016-09-30 08:36:38" AND observationMJD="57661.
→3587675" AND primaryKeyId="1398489" AND raDeg="319.92203" AND raDegErr="0.00000"
→AND reducer="0" AND referenceImageUrl="0" AND replacedByRowId="0" AND sherlockClassification="0" AND spectralType="0" AND subtractedImageUrl="0" AND survey="ATLAS" AND surveyObjectUrl="http://psweb.mp.qub.ac.uk/sne/atlas3/candidate/1211941281215756900/" AND targetImageUrl="0" AND telescope="0" AND tmpFlag="0" AND transientBucketId="1387901" AND transientRedshift="0" AND transientRedshiftNotes="0" AND transientTypePredicationSource="0" AND transientTypePrediction="0" AND tripletImageUrl="0" AND updated=1)

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INSERT INTO `my_results` (classificationPhase,classificationWRTMax,cmSepArcsec,cx,cy,
→cz,dateCreated,dateDeleted,dateLastModified,dateLastRead,decDeg,decDegErr,
→discoveryPhase,filter,finderImageUrl,hostRedshift,hostRedshiftType,html0ID,html13ID,
→html16ID,html20ID,instrument,lastNonDetectionDate,lastNonDetectionMJD,lightcurveURL,
→limitingMag,magnitude,magnitudeError,masterIDFlag,name,observationDate,
→observationMJD,primaryKeyId,raDeg,raDegErr,reducer,referenceImageUrl,
→replacedByRowId,sherlockClassification,spectralType,subtractedImageUrl,survey,
→surveyObjectUrl,targetImageUrl,telescope,tmpFlag,transientBucketId,
→transientRedshift,transientRedshiftNotes,transientTypePredicationSource,
→transientTypePrediction,tripletImageUrl) VALUES (null,null,"0.753210240087",
→"0.709623009487", "-0.597092312286", "0.374053411983", "2016-10-01 19:12:26", null,
→"2016-10-01 19:12:26", null, "21.96582", null, null, "c", null, null, null,
→"13458566", "861348238", "55126287254", "14112329537185", null, null, null, null, "0
→", "17.86", "0.07", "0", "ATLAS16dbz", "2016-09-30 08:49:45", "57661.3678845",
→"1398486", "319.92201", null, null, null, "0", null, null, null, "ATLAS", "http://
→psweb.mp.qub.ac.uk/sne/atlas3/candidate/1211941281215756900/", null, null, null,
→"1387901", null, null, null, null, null) ON DUPLICATE KEY UPDATE
→classificationPhase=null, classificationWRTMax=null, cmSepArcsec="0.753210240087",
→cx="0.709623009487", cy="-0.597092312286", cz="0.374053411983", dateCreated="2016-
→10-01 19:12:26", dateDeleted=null, dateLastModified="2016-10-01 19:12:26",
→dateLastRead=null, decDeg="21.96582", decDegErr=null, discoveryPhase=null, filter="c
→", finderImageUrl=null, hostRedshift=null, hostRedshiftType=null, html0ID="13458566
→", html13ID="861348238", html16ID="55126287254", html20ID="14112329537185",
→instrument=null, lastNonDetectionDate=null, lastNonDetectionMJD=null,
→lightcurveURL=null, limitingMag="0", magnitude="17.86", magnitudeError="0.07",
→masterIDFlag="0", name="ATLAS16dbz", observationDate="2016-09-30 08:49:45",
→observationMJD="57661.3678845", primaryKeyId="1398486", raDeg="319.92201",
→raDegErr=null, reducer=null, referenceImageUrl=null, replacedByRowId="0",
→sherlockClassification=null, spectralType=null, subtractedImageUrl=null, survey=
→"ATLAS", surveyObjectUrl="http://psweb.mp.qub.ac.uk/sne/atlas3/candidate/
→1211941281215756900/", targetImageUrl=null, telescope=null, tmpFlag=null,
→transientBucketId="1387901", transientRedshift=null, transientRedshiftNotes=null,
→transientTypePredicationSource=null, transientTypePrediction=null,
→tripletImageUrl=null, updated=IF( classificationPhase=null AND
→classificationWRTMax is null AND cmSepArcsec="0.753210240087" AND cx="0.
→709623009487" AND cy="-0.597092312286" AND cz="0.374053411983" AND dateCreated=
→"2016-10-01 19:12:26" AND dateDeleted is null AND dateLastModified="2016-10-01
→19:12:26" AND dateLastRead is null AND decDeg="21.96582" AND decDegErr is null
→AND discoveryPhase is null AND filter="c" AND finderImageUrl is null AND
→hostRedshift is null AND hostRedshiftType is null AND html0ID="13458566" AND
→html13ID="861348238" AND html16ID="55126287254" AND html20ID="14112329537185" AND
→instrument is null AND lastNonDetectionDate is null AND lastNonDetectionMJD is
→null AND lightcurveURL is null AND limitingMag="0" AND magnitude="17.86" AND
→magnitudeError="0.07" AND masterIDFlag="0" AND name="ATLAS16dbz" AND
→observationDate="2016-09-30 08:49:45" AND observationMJD="57661.3678845" AND
→primaryKeyId="1398486" AND raDeg="319.92201" AND raDegErr is null AND reducer is
→null AND referenceImageUrl is null AND replacedByRowId="0" AND
→sherlockClassification is null AND spectralType is null AND subtractedImageUrl is
→null AND survey="ATLAS" AND surveyObjectUrl="http://psweb.mp.qub.ac.uk/sne/atlas3/
→candidate/1211941281215756900/" AND targetImageUrl is null AND telescope is null
→AND tmpFlag is null AND transientBucketId="1387901" AND transientRedshift is
→null AND transientRedshiftNotes is null AND transientTypePredicationSource is
→null AND transientTypePrediction is null AND tripletImageUrl=null, 0, 1),
→dateLastModified=IF( classificationPhase=null AND classificationWRTMax is null AND
→cmSepArcsec="0.753210240087" AND cx="0.709623009487" AND cy="-0.597092312286"
→AND cz="0.374053411983" AND dateCreated="2016-10-01 19:12:26" AND dateDeleted is
→null AND dateLastModified="2016-10-01 19:12:26" AND dateLastRead is null AND
→decDeg="21.96582" AND decDegErr is null AND discoveryPhase is null AND
→finderImageUrl is null AND hostRedshift is null AND hostRedshiftType is
→null AND html0ID="13458566" AND html13ID="861348238" AND html16ID="55126287254"
→AND html20ID="14112329537185" AND instrument is null AND lastNonDetectionDate is
→null AND lastNonDetectionMJD is null AND lightcurveURL is null AND limitingMag="0
→" AND magnitude="17.86" AND magnitudeError="0.07" AND masterIDFlag="0" AND name=
→"ATLAS16dbz" AND observationDate="2016-09-30 08:49:45" AND observationMJD="57661.

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INSERT INTO `my_results` (classificationPhase,classificationWRTMax,cmSepArcsec,cx,cy,
cz,dateCreated,dateDeleted,dateLastModified,dateLastRead,decDeg,decDegErr,
discoveryPhase,filter,finderImageUrl,hostRedshift,hostRedshiftType,html0ID,html13ID,
html16ID,html20ID,instrument,lastNonDetectionDate,lastNonDetectionMJD,lightcurveURL,
limitingMag,magnitude,magnitudeError,masterIDFlag,name,observationDate,
observationMJD,primaryKeyId,raDeg,raDegErr,reducer,referenceImageUrl,
replacedByRowId,sherlockClassification,spectralType,subtractedImageUrl,survey,
surveyObjectUrl,targetImageUrl,telescope,tmpFlag,transientBucketId,
transientRedshift,transientRedshiftNotes,transientTypePredicationSource,
transientTypePrediction,tripletImageUrl) VALUES (null,null,"0.813780637869",null,
"0.70962235838", "-0.597094302902", "0.374051469625", "2016-10-01 19:12:26", null,
"2016-10-01 19:12:26", null, "21.9657", null, null, "c", null, null, null, "13458566",
"861348238", "55126287255", "14112329537311", null, null, null, null, "0", "17.88",
"0.07", "0", "ATLAS16dbz", "2016-09-30 08:23:12", "57661.3494495", "1398487",
"319.92189", null, null, null, "0", null, null, null, "ATLAS", "http://psweb.mp.qub.
ac.uk/sne/atlas3/candidate/1211941281215756900/", null, null, null, "1387901", null,
null, null, null, null) ON DUPLICATE KEY UPDATE classificationPhase=null,
classificationWRTMax=null, cmSepArcsec="0.813780637869", cx="0.70962235838", cy="-0.
597094302902", cz="0.374051469625", dateCreated="2016-10-01 19:12:26",
dateDeleted=null, dateLastModified="2016-10-01 19:12:26", dateLastRead=null, decDeg=
"21.9657", decDegErr=null, discoveryPhase=null, filter="c", finderImageUrl=null,
hostRedshift=null, hostRedshiftType=null, html0ID="13458566", html13ID="861348238",
html16ID="55126287255", html20ID="14112329537311", instrument=null,
lastNonDetectionDate=null, lastNonDetectionMJD=null, lightcurveURL=null,
limitingMag="0", magnitude="17.88", magnitudeError="0.07", masterIDFlag="0", name=
"ATLAS16dbz", observationDate="2016-09-30 08:23:12", observationMJD="57661.3494495",
primaryKeyId="1398487", raDeg="319.92189", raDegErr=null, reducer=null,
referenceImageUrl=null, replacedByRowId="0", sherlockClassification=null,
spectralType=null, subtractedImageUrl=null, survey="ATLAS", surveyObjectUrl="http://
psweb.mp.qub.ac.uk/sne/atlas3/candidate/1211941281215756900/", targetImageUrl=null,
telescope=null, tmpFlag=null, transientBucketId="1387901", transientRedshift=null,
transientRedshiftNotes=null, transientTypePredicationSource=null,
transientTypePrediction=null, tripletImageUrl=null, updated=IF(
classificationPhase=null AND classificationWRTMax is null AND cmSepArcsec="0.
813780637869" AND cx="0.70962235838" AND cy="-0.597094302902" AND cz="0.
374051469625" AND dateCreated="2016-10-01 19:12:26" AND dateDeleted is null AND
dateLastModified="2016-10-01 19:12:26" AND dateLastRead is null AND decDeg="21.
9657" AND decDegErr is null AND discoveryPhase is null AND filter="c" AND
finderImageUrl is null AND hostRedshift is null AND hostRedshiftType is null AND
html0ID="13458566" AND html13ID="861348238" AND html16ID="55126287255" AND html20ID=
"14112329537311" AND instrument is null AND lastNonDetectionDate is null AND
lastNonDetectionMJD is null AND lightcurveURL is null AND limitingMag="0" AND
magnitude="17.88" AND magnitudeError="0.07" AND masterIDFlag="0" AND name=
"ATLAS16dbz" AND observationDate="2016-09-30 08:23:12" AND observationMJD="57661.
3494495" AND primaryKeyId="1398487" AND raDeg="319.92189" AND raDegErr is null
AND reducer is null AND referenceImageUrl is null AND replacedByRowId="0" AND
sherlockClassification is null AND spectralType is null AND subtractedImageUrl is
null AND survey="ATLAS" AND surveyObjectUrl="http://psweb.mp.qub.ac.uk/sne/atlas3/
candidate/1211941281215756900/" AND targetImageUrl is null AND telescope is null
AND tmpFlag is null AND transientBucketId="1387901" AND transientRedshift is
null AND transientRedshiftNotes is null AND transientTypePredicationSource is
null AND transientTypePrediction is null AND tripletImageUrl=null, 0, 1),
dateLastModified=IF( classificationPhase=null AND classificationWRTMax is null AND
cmSepArcsec="0.813780637869" AND cx="0.70962235838" AND cy="-0.597094302902" AND
cz="0.374051469625" AND dateCreated="2016-10-01 19:12:26" AND dateDeleted is
null AND dateLastModified="2016-10-01 19:12:26" AND dateLastRead is null AND
decDeg="21.9657" AND decDegErr is null AND discoveryPhase is null AND filter="c"
AND finderImageUrl is null AND hostRedshift is null AND hostRedshiftType is null
AND html0ID="13458566" AND html13ID="861348238" AND html16ID="55126287255" AND
html20ID="14112329537311" AND instrument is null AND lastNonDetectionDate is null
AND lastNonDetectionMJD is null AND lightcurveURL is null AND limitingMag="0"
AND magnitude="17.88" AND magnitudeError="0.07" AND masterIDFlag="0" AND name=
"ATLAS16dbz" AND observationDate="2016-09-30 08:23:12" AND observationMJD="57661.
3494495" AND primaryKeyId="1398487" AND raDeg="319.92189" AND raDegErr is null
AND reducer is null AND referenceImageUrl is null AND replacedByRowId="0" AND
sherlockClassification is null AND spectralType is null AND subtractedImageUrl is
null AND survey="ATLAS" AND surveyObjectUrl="http://psweb.mp.qub.ac.uk/sne/atlas3/
candidate/1211941281215756900/" AND targetImageUrl is null AND telescope is null
AND tmpFlag is null AND transientBucketId="1387901" AND transientRedshift is
null AND transientRedshiftNotes is null AND transientTypePredicationSource is
null AND transientTypePrediction is null AND tripletImageUrl=null, 0, 1),
dateLastModified=IF( classificationPhase=null AND classificationWRTMax is null AND
cmSepArcsec="0.813780637869" AND cx="0.70962235838" AND cy="-0.597094302902" AND
cz="0.374051469625" AND dateCreated="2016-10-01 19:12:26" AND dateDeleted is
null AND dateLastModified="2016-10-01 19:12:26" AND dateLastRead is null AND
decDeg="21.9657" AND decDegErr is null AND discoveryPhase is null AND filter="c"
AND finderImageUrl is null AND hostRedshift is null AND hostRedshiftType is null
AND html0ID="13458566" AND html13ID="861348238" AND html16ID="55126287255" AND
html20ID="14112329537311" AND instrument is null AND lastNonDetectionDate is null
AND lastNonDetectionMJD is null AND lightcurveURL is null AND limitingMag="0"
AND magnitude="17.88" AND magnitudeError="0.07" AND masterIDFlag="0" AND name=
"ATLAS16dbz" AND observationDate="2016-09-30 08:23:12" AND observationMJD="57661.
3494495" AND primaryKeyId="1398487" AND raDeg="319.92189" AND raDegErr is null
AND reducer is null AND referenceImageUrl is null AND replacedByRowId="0" AND
sherlockClassification is null AND spectralType is null AND subtractedImageUrl is
null AND survey="ATLAS" AND surveyObjectUrl="http://psweb.mp.qub.ac.uk/sne/atlas3/
candidate/1211941281215756900/" AND targetImageUrl is null AND telescope is null
AND tmpFlag is null AND transientBucketId="1387901" AND transientRedshift is
null AND transientRedshiftNotes is null AND transientTypePredicationSource is
null AND transientTypePrediction is null AND tripletImageUrl=null, 0, 1),
dateLastModified=IF( classificationPhase=null AND classificationWRTMax is null AND
cmSepArcsec="0.813780637869" AND cx="0.70962235838" AND cy="-0.597094302902" AND
cz="0.374051469625" AND dateCreated="2016-10-01 19:12:26" AND dateDeleted is
null AND dateLastModified="2016-10-01 19:12:26" AND dateLastRead is null AND
decDeg="21.9657" AND decDegErr is null AND discoveryPhase is null AND filter="c"
AND finderImageUrl is null AND hostRedshift is null AND hostRedshiftType is null
AND html0ID="13458566" AND html13ID="861348238" AND html16ID="55126287255" AND
html20ID="14112329537311" AND instrument is null AND lastNonDetectionDate is null
AND lastNonDetectionMJD is null AND lightcurveURL is null AND limitingMag="0"
AND magnitude="17.88" AND magnitudeError="0.07" AND masterIDFlag="0" AND name=
"ATLAS16dbz" AND observationDate="2016-09-30 08:23:12" AND observationMJD="57661.
3494495" AND primaryKeyId="1398487" AND raDeg="319.92189" AND raDegErr is null
AND reducer is null AND referenceImageUrl is null AND replacedByRowId="0" AND
sherlockClassification is null AND spectralType is null AND subtractedImageUrl is
null AND survey="ATLAS" AND surveyObjectUrl="http://psweb.mp.qub.ac.uk/sne/atlas3/
candidate/1211941281215756900/" AND targetImageUrl is null AND telescope is null
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null AND transientRedshiftNotes is null AND transientTypePredicationSource is
null AND transientTypePrediction is null AND tripletImageUrl=null, 0, 1),
dateLastModified=IF( classificationPhase=null AND classificationWRTMax is null AND
cmSepArcsec="0.813780637869" AND cx="0.70962235838" AND cy="-0.597094302902" AND
cz="0.374051469625" AND dateCreated="2016-10-01 19:12:26" AND dateDeleted is
null AND dateLastModified="2016-10-01 19:12:26" AND dateLastRead is null AND
decDeg="21.9657" AND decDegErr is null AND discoveryPhase is null AND filter="c"
AND finderImageUrl is null AND hostRedshift is null AND hostRedshiftType is null
AND html0ID="13458566" AND html13ID="861348238" AND html16ID="55126287255" AND
html20ID="14112329537311" AND instrument is null AND lastNonDetectionDate is null
AND lastNonDetectionMJD is null AND lightcurveURL is null AND limitingMag="0"
AND magnitude="17.88" AND magnitudeError="0.07" AND masterIDFlag="0" AND name=
"ATLAS16dbz" AND observationDate="2016-09-30 08:23:12" AND observationMJD="57661.
3494495" AND primaryKeyId="1398487" AND raDeg="319.92189" AND raDegErr is null
AND reducer is null AND referenceImageUrl is null AND replacedByRowId="0" AND
sherlockClassification is null AND spectralType is null AND subtractedImageUrl is
null AND survey="ATLAS" AND surveyObjectUrl="http://psweb.mp.qub.ac.uk/sne/atlas3/
candidate/1211941281215756900/" AND targetImageUrl is null AND telescope is null
AND tmpFlag is null AND transientBucketId="1387901" AND transientRedshift is
null AND transientRedshiftNotes is null AND transientTypePredicationSource is
null AND transientTypePrediction is null AND tripletImageUrl=null, 0, 1),
dateLastModified=IF( classificationPhase=null AND classificationWRTMax is null AND
cmSepArcsec="0.813780637869" AND cx="0.70962235838" AND cy="-0.597094302902" AND
cz="0.374051469625" AND dateCreated="2016-10-01 19:1
```

(continued from previous page)

1.5 Todo List

Todo:

- nice!
-

(The *original entry* is located in `/home/docs/checkouts/readthedocs.org/user_builds/hmpty/checkouts/develop/docs/source/_template.m` line 1.)

1.6 Release Notes

v1.5.5 - December 8, 2021

- **FIXED** Install on macOS monterey

v1.5.4 - August 16, 2021

- **FIXED** Command-line tools

v1.5.3 - June 23, 2020

- **FIXED** When matching 2 lists of coordinates, if a list location was matched against more than one item in the second match list the angular separation of the first match got over-written by the second match.

v1.5.1 - May 19, 2020

- **FIXED** MacOS install was needlessly involved.

v1.5.0 - May 8, 2020

- Now compatible with python 3.*

API REFERENCE

2.1 Modules

<i>HMpTy.commonutils</i>	<i>common tools used throughout package</i>
<i>HMpTy.htm</i>	<i>The HTM and Matcher Objects</i>
<i>HMpTy.mysql</i>	<i>MySQL tools involving HTMs</i>
<i>HMpTy.htm.htm</i>	<i>Tools for working with Hierarchical Triangular Meshes, including coordinate crossmatching</i>
<i>HMpTy.utKit</i>	<i>Unit testing tools</i>

2.1.1 commonutils (module)

common tools used throughout package

2.1.2 htm (module)

The HTM and Matcher Objects

Classes

<i>HTM([depth, log])</i>	<i>A Hierarchical Triangular Mesh object</i>
<i>Matcher(ra, dec[, depth, log, convertToArray])</i>	<i>A matcher-array object to match other arrays of ra,dec against</i>
<i>sets(log, ra, dec, radius, sourceList[, ...])</i>	<i>Given a list of coordinates and a crossmatch radius, split the list up into sets of associated locations</i>

2.1.3 mysql (module)

MySQL tools involving HTMs

Classes

<code>conesearch(log, dbConn, tableName, columns, ...)</code>	<i>The worker class for the conesearch module</i>
---	---

Functions

<code>add_htm_ids_to_mysql_database_table(...[, ...])</code>	<i>Given a database connection, a name of a table and the column names for RA and DEC, generates ID for one or more HTM level in the table</i>
--	--

2.1.4 htm (module)

Tools for working with Hierarchical Triangular Meshes, including coordinate crossmatching

Author David Young (originally forked from Erin Sheldon's esutil - esheldon)

Classes

<code>HTM([depth, log])</code>	<i>A Hierarchical Triangular Mesh object</i>
<code>Matcher(ra, dec[, depth, log, convertToArray])</code>	<i>A matcher-array object to match other arrays of ra,dec against</i>
<code>tools(arguments, docString[, logLevel, ...])</code>	<i>common setup methods & attributes of the main function in cl-util</i>
<code>unit_conversion(log[, settings])</code>	<i>The worker class for the unit_conversion module</i>

Functions

<code>old_div(a, b)</code>	<i>Equivalent to <code>a / b</code> on Python 2 without <code>from __future__ import division</code>.</i>
----------------------------	---

2.1.5 utKit (module)

Unit testing tools

Classes

<code>utKit(moduleDirectory[, dbConn])</code>	<i>Override dryx utKit</i>
---	----------------------------

2.2 Classes

<code>HMPty.htm.htm.HTM</code>	<i>A Hierarchical Triangular Mesh object</i>
<code>HMPty.htm.htm.Matcher</code>	<i>A matcher-array object to match other arrays of ra,dec against</i>
<code>HMPty.htm.sets</code>	<i>Given a list of coordinates and a crossmatch radius, split the list up into sets of associated locations</i>
<code>HMPty.mysql.conesearch</code>	<i>The worker class for the conesearch module</i>

2.2.1 HTM (class)

class `HTM` (*depth=16, log=False*)
 Bases: `HMPty.htm._htmcode.HTMC`

A Hierarchical Triangular Mesh object

Key Arguments

- `depth` – the depth of the mesh you wish to create. Default *16*

Usage

To generate a mesh object:

```
from HMPty import HTM
mesh16 = HTM(
    depth=16
)
```

Methods

<code>cbincount(*args)</code>	
<code>cmatch(*args)</code>	
<code>init([depth])</code>	
<code>intersect(ra, dec, radius[, inclusive, ...])</code>	<i>return IDs of all triangles contained within and/or intersecting a circle centered on a given ra and dec</i>
<code>lookup_id(ra, dec)</code>	<i>Lookup the ID of HTM trixel that a coordinate or lists of coordinates lie on</i>
<code>match(ra1, dec1, ra2, dec2, radius[, ...])</code>	<i>Crossmatch two lists of ra/dec points</i>

Properties

<code>area</code>	<i>The mean area of triangles in this mesh in units of square degrees.</i>
<code>depth</code>	<i>the depth of the HTM tree</i>

intersect (*ra, dec, radius, inclusive=True, convertCoordinates=True*)

return IDs of all triangles contained within and/or intersecting a circle centered on a given ra and dec

Key Arguments

- `ra` – RA of central point in decimal degrees or sexagesimal
- `dec` – DEC of central point in decimal degrees or sexagesimal
- `radius` – radius of circle in degrees
- `inclusive` – include IDs of triangles that intersect the circle as well as those completely inclosed by the circle. Default *True*
-

Return

- `trixelArray` – a numpy array of the match trixel IDs

Usage

To return the trixels overlapping a circle with a 10 arcsec radius centred at 23:25:53.56, +26:54:23.9

```
overlappingTrixels = mesh16.intersect(
    ra="23:25:53.56",
    dec="+26:54:23.9",
    radius=10 / (60 * 60),
    inclusive=True
)
```

Or to return the trixels completely enclosed by a circle with a 1 degree radius centred at 23:25:53.56, +26:54:23.9

```
overlappingTrixels = mesh16.intersect(
    ra="23:25:53.56",
    dec="+26:54:23.9",
    radius=1,
    inclusive=False
)
```

lookup_id (*ra, dec*)

Lookup the ID of HTM trixel that a coordinate or lists of coordinates lie on

Key Arguments

- `ra` – list, numpy array or single ra value (first coordinate set)
- `dec` – list, numpy array or single dec value (first coordinate set - must match ra1 array length)

Return

- `htmIds` – a list of HTM trixel ids the coordinates lie on

Usage

To find the trixel IDs that a set of coordinate lie on:

```

raList1 = ["13:20:00.00", 200.0, "13:20:00.00", 175.23, 21.36]
decList1 = ["+24:18:00.00", 24.3, "+24:18:00.00", -28.25, -15.32]

htmids = mesh.lookup_id(raList1, decList1)
for h, r, d in zip(htmids, raList1, decList1):
    print(r, d, " --> ", h)

```

match (ra1, dec1, ra2, dec2, radius, maxmatch=1, convertToArray=True)

Crossmatch two lists of ra/dec points

This is very efficient for large search angles and large lists. Note, if you need to match against the same points many times, you should use a `Matcher` object

Key Arguments

- `ra1` – list, numpy array or single ra value (first coordinate set)
- `dec1` – list, numpy array or single dec value (first coordinate set - must match `ra1` array length)
- `ra2` – list, numpy array or single ra value (second coordinate set)
- `dec2` – list, numpy array or single dec value (second coordinate set - must match `ra2` array length)
- `radius` – search radius in degrees. Can be list, numpy array or single value. If list or numpy array must be same length as `ra1` array length)
- `maxmatch` – maximum number of matches to return. Set to 0 to match all points. Default 1 (i.e. closest match)
- `convertToArray` – convert the coordinates into an array. Default `True`. Can bypass the conversion check if you are sure coordinates in numpy array

Return

- `matchIndices1` – match indices for list1 (ra1, dec1)
- `matchIndices2` – match indices for list2 (ra2, dec2)
- `sepDeg` – separations between matched coordinates in degrees. All returned arrays are the same size

Usage

To match 2 lists of coordinates try something like this:

```

twoArcsec = 2.0 / 3600.
raList1 = [200.0, 200.0, 200.0, 175.23, 21.36]
decList1 = [24.3, 24.3, 24.3, -28.25, -15.32]
raList2 = [200.0, 200.0, 200.0, 175.23, 55.25]
decList2 = [24.3 + 0.75 * twoArcsec, 24.3 + 0.25 * twoArcsec,
            24.3 - 0.33 * twoArcsec, -28.25 + 0.58 * twoArcsec, 75.22]
matchIndices1, matchIndices2, seps = mesh.match(
    ra1=raList1,
    dec1=decList1,
    ra2=raList2,
    dec2=decList2,
    radius=twoArcsec,
    maxmatch=0
)

for m1, m2, s in zip(matchIndices1, matchIndices2, seps):
    print(raList1[m1], decList1[m1], " -> ", s * 3600., " arcsec -> ",
          raList2[m2], decList2[m2])

```

Note from the print statement, you can index the arrays `raList1`, `decList1` with the `matchIndices1` array values and `raList2`, `decList2` with the `matchIndices2` values.

property area

The mean area of triangles in this mesh in units of square degrees.

Usage

```
mesh.area
```

property depth

the depth of the HTM tree

Usage

```
mesh.depth
```

2.2.2 Matcher (class)

class `Matcher` (*ra*, *dec*, *depth=16*, *log=False*, *convertToArray=True*)

Bases: `HMPy.htm._htmlCode.Matcher`

A matcher-array object to match other arrays of ra,dec against

The `Matcher` object is initialized with a set of ra,dec coordinates and can then be used and reused to match against other sets of coordinates

Key Arguments

- `log` – logger
- `depth` – the depth of the mesh generate the `Matcher` object at. Default *16*
- `ra` – list, numpy array or single ra value
- `dec` – list, numpy array or single dec value (must match ra array length)
- `convertToArray` – convert the coordinates into an array. Default *True*. Can bypass the conversion check if you are sure coordinates in numpy array

Return

- `None`

Usage

If we have a set of coordinates such that:

```
raList1 = [200.0, 200.0, 200.0, 175.23, 21.36]
decList1 = [24.3, 24.3, 24.3, -28.25, -15.32]
```

We can initialise a matcher object like so:

```
from HMPy import Matcher
coordinateSet = Matcher(
    log=log,
    ra=raList1,
    dec=decList1,
    depth=16
)
```

Methods

`get_depth()`

<code>match(ra, dec, radius[, maxmatch])</code>	<i>match a corrdinate set against this Matcher object's coordinate set</i>
---	--

Properties

<code>depth</code>	<i>the depth of the Matcher object</i>
--------------------	--

match (*ra, dec, radius, maxmatch=1*)
match a corrdinate set against this Matcher object's coordinate set

Key Arguments

- *ra* – list, numpy array or single ra value
- *dec* – list, numpy array or single dec value (must match ra array length)
- *radius* – radius of circle in degrees
- *maxmatch* – maximum number of matches to return. Set to 0 to match all points. Default 1 (i.e. closest match)

Return

- None

Usage

Once we have initialised a Matcher coordinateSet object we can match other coordinate sets against it:

```
twoArcsec = 2.0 / 3600.
raList2 = [200.0, 200.0, 200.0, 175.23, 55.25]
decList2 = [24.3 + 0.75 * twoArcsec, 24.3 + 0.25 * twoArcsec,
            24.3 - 0.33 * twoArcsec, -28.25 + 0.58 * twoArcsec, 75.22]

matchIndices1, matchIndices2, seps = coordinateSet.match(
    ra=raList2,
    dec=decList2,
    radius=twoArcsec,
    maxmatch=0
)

for m1, m2, s in zip(matchIndices1, matchIndices2, seps):
    print(raList1[m1], decList1[m1], " -> ", s * 3600., " arcsec -> ",
          ↪raList2[m2], decList2[m2])
```

Or to return just the nearest matches:

```
matchIndices1, matchIndices2, seps = coordinateSet.match(
    ra=raList2,
    dec=decList2,
    radius=twoArcsec,
    maxmatch=1
)
```

Note from the print statement, you can index the arrays `raList1`, `decList1` with the `matchIndices1` array values and `raList2`, `decList2` with the `matchIndices2` values.

property depth

the depth of the Matcher object

Usage

```
coordinateSet.depth
```

2.2.3 sets (class)

class sets (*log, ra, dec, radius, sourceList, convertToArray=True*)

Bases: object

Given a list of coordinates and a crossmatch radius, split the list up into sets of associated locations

Key Arguments

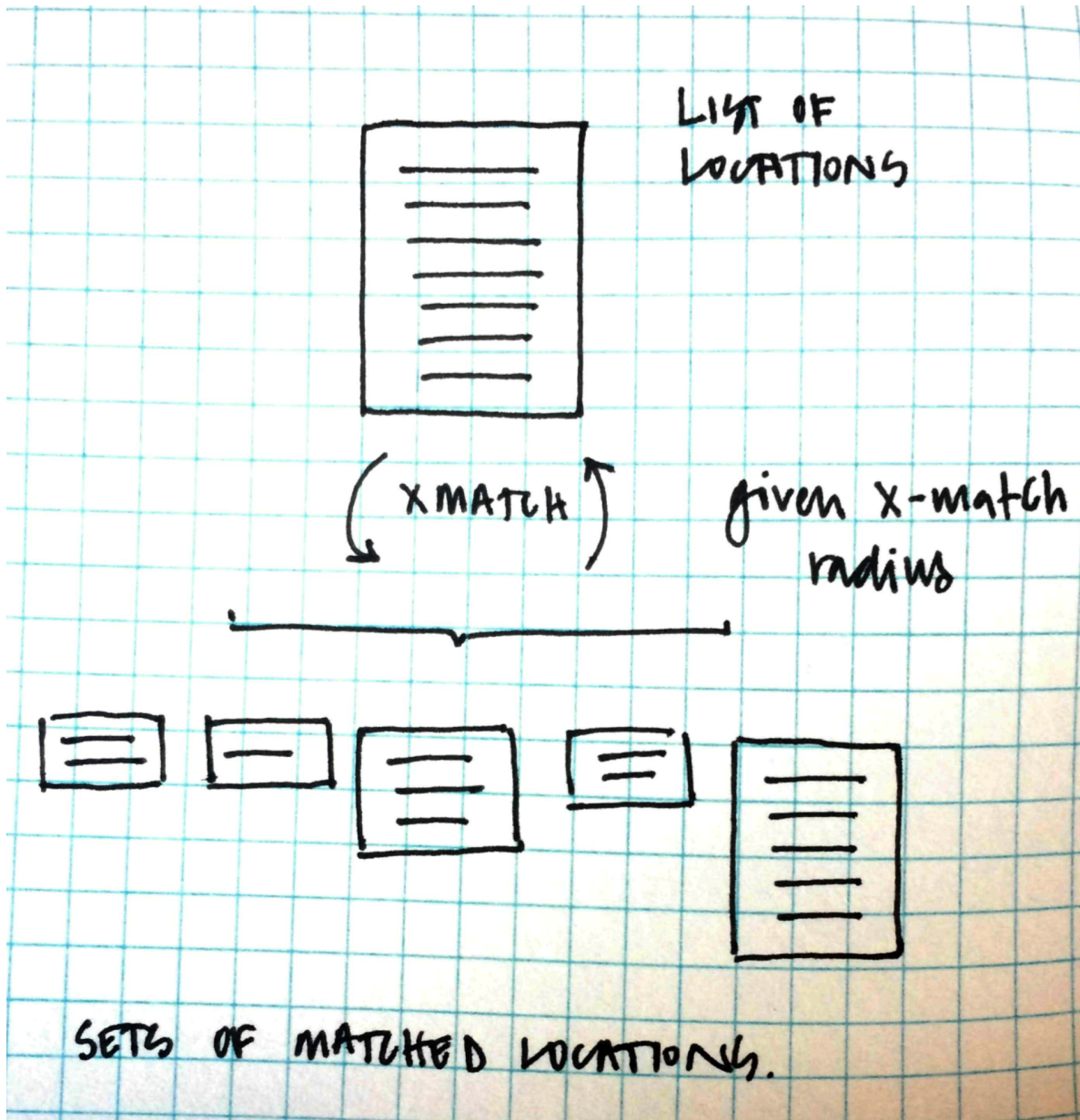
- `log` – logger
- `ra` – a list of the coordinate right ascensions
- `dec` – a list of the coordinate declinations (same length as `ra`)
- `radius` – the radius to crossmatch the list of coordinates against itself (degrees)
- `sourceList` – the list of source information to be divided into associated sets (same length as `ra` and `dec`)
- `convertToArray` – convert the coordinates into an array. Default *True*. Can bypass the conversion check if you are sure coordinates in numpy array

Usage

Given a list of transient metadata (any list, possibly a list of dictionaries) you can divide the list to associated sets of transients by running the following code:

```
from HMPty.htm import sets
xmatcher = sets(
    log=log,
    ra=raList,
    dec=decList,
    radius=10 / (60. * 60.),
    sourceList=transientList
)
allMatches = xmatcher.match
```

`raList` and `decList` are the coordinates for the sources found in the `transientList` and are therefore the same length as the `transientList` (it's up to the user to create these lists). This code will group the sources into set of associated transients which are within a radius of 10 arcsecs from one-another. `allMatches` is a list of lists, each contained list being an associate group of sources.



```
:width: 800px
:alt: divide a list of sources into associated sets
```

Methods

Properties

match	<i>all of the associated sets of sources</i>
-------	--

property match

all of the associated sets of sources

See the class for usage

2.2.4 conesearch (class)

class conesearch(log, dbConn, tableName, columns, ra, dec, radiusArcsec, sqlWhere=False, raCol='raDeg', decCol='decDeg', separations=False, distinct=False, closest=False)

Bases: object

The worker class for the conesearch module

Key Arguments

- log – logger
- dbConn – a database connection
- tableName – the name of the database table to perform the conesearch on.
- columns – the columns requested from the database table
- ra – the right ascension of the conesearch centre, can be single value or list of values
- dec – the declination of the conesearch centre, can be single value or list of values
- radiusArcsec – radius of the conesearch to be performed in arcsecs
- sqlWhere – clause to add after “where” in the initial sql query of the conesearch. Default *False*
- raCol – the database table ra column name. Default ** raDeg**
- decCol – the database table dec column name. Default *decDeg*
 - separations – include the separations in the final output. Default *False*
 - distinct – request distinct columns from the database table (i.e. *select DISTINCT ...*). Default *False*
 - closest – return the closest match only. Default *False*

Usage

Say we have 5 locations we wish to search a database table called *transientBucket* to see if it contains sources at those locations. Add the coordinates to those locations to RA and DEC lists like so:

```
raList = ["23:25:53.56", "02:10:08.16",
          "13:20:00.00", 1.47329, 35.34279]
decList = ["+26:54:23.9", "-48:38:24.3",
           "+24:18:00.00", 8.43016, -42.34428]
```

Note coordinates can be in decimal degrees or sexagesimal format (or both).

To initialise a 10 arcsec conesearch to return the *transientBucketId* and *spectralType* values from any resulting match use the code:


```

from HMPty.mysql import conesearch
cs = conesearch(
    log=log,
    dbConn=dbConn,
    tableName="transientBucket",
    columns="transientBucketId, spectralType",
    ra=raList,
    dec=decList,
    radiusArcsec=10,
    separations=False,
    distinct=False,
    sqlWhere=False
)

```

Using the query property of the conesearch object you can inspect the initial sql query to be run on the database:

```
print(cs.query)
```

```

select transientBucketId, spectralType, raDeg, decDeg from transientBucket where
↳html6ID in (51985593986,51985593989,51985593993,51985593994,51985593995,
↳51985593996,51985593997,51985593998,51985593999,51985594037, ... ,38488627914,
↳38488627916,38488627918,38488627919,38488627956,38488627957,38488627959)

```

To execute the query and return the results:

```
matchIndies, matches = cs.search()
```

The matchIndies are the indices of the coordinate in the original raList and decList lists and the matches the matched rows from the database table.

To constrain your results a little more define the distinct and or sqlWhere attributes of the conesearch:

```

from HMPty.mysql import conesearch
cs = conesearch(
    log=log,
    dbConn=dbConn,
    tableName="transientBucket",
    columns="transientBucketId, spectralType",
    ra=raList1,
    dec=decList1,
    radiusArcsec=10,
    separations=True,
    distinct=True,
    sqlWhere="spectralType is not null"
)

matchIndies, matches = cs.search()

for row in matches.list:
    print(row)

```

```

```text
{'raDeg': 351.473208333, 'cmSepArcsec': 0.13379807128325164, 'decDeg': 26.
↳9066388889, 'spectralType': u'SN Ia', 'transientBucketId': 1375799L}
{'raDeg': 32.534, 'cmSepArcsec': 0.031941633602975743, 'decDeg': -48.6400888889,
↳'spectralType': u'II', 'transientBucketId': 1328883L}

```

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```
{'raDeg': 1.4732916667, 'cmSepArcsec': 0.0068727452774991196, 'decDeg': 8.
↳4301611111, 'spectralType': u'SN Ia', 'transientBucketId': 1321322L}
{'raDeg': 35.3427916667, 'cmSepArcsec': 0.0043467057710126393, 'decDeg': -42.
↳3442805556, 'spectralType': u'Ia', 'transientBucketId': 1307226L}
```

```

Note that by adding ``separations=True`` the matched source separations from the original coordinate lists have been injected into the results.

It is possible to render the results in csv, json, markdown, yaml or ascii table format. For example:

```
```python
print(matches.table())
```
```

```
```text
```

raDeg	spectralType	decDeg	cmSepArcsec	transientBucketId
351.4732	SN Ia	26.9066	0.1338	1375799
32.5340	II	-48.6401	0.0319	1328883
1.4733	SN Ia	8.4302	0.0069	1321322
35.3428	Ia	-42.3443	0.0043	1307226

```
```
```

To save the results to file:

```
```python
matches.table(filepath="/path/to/my/results.dat")
```
```

To instead render as csv, json, markdown or yaml use:

```
```python
matches.csv(filepath="/path/to/my/results.csv")
matches.json(filepath="/path/to/my/results.json")
matches.markdown(filepath="/path/to/my/results.md")
matches.markdown(filepath="/path/to/my/results.yaml")
```
```

Finally, to render the results as mysql inserts, use the following code:

```
```python
matches.mysql(tableName="mysql_table", filepath=None, createStatement=False)
```
```

```
```text
```

```
INSERT INTO `mysql_table` (cmSepArcsec,decDeg,raDeg,spectralType,
↳transientBucketId) VALUES ("0.133798071283" ,"26.9066388889" ,"351.473208333" ,
↳"SN Ia" ,"1375799") ON DUPLICATE KEY UPDATE cmSepArcsec="0.133798071283",
↳decDeg="26.9066388889", raDeg="351.473208333", spectralType="SN Ia",
↳transientBucketId="1375799", updated=IF(cmSepArcsec="0.133798071283" AND
↳decDeg="26.9066388889" AND raDeg="351.473208333" AND spectralType="SN Ia" AND
↳transientBucketId="1375799", 0, 1), dateLastModified=IF(cmSepArcsec="0.
↳133798071283" AND decDeg="26.9066388889" AND raDeg="351.473208333" AND
↳spectralType="SN Ia" AND transientBucketId="1375799", NOW(),
↳;
(continues on next page)
```

(continued from previous page)

```
INSERT INTO `mysql_table` (cmSepArcsec,decDeg,raDeg,spectralType,
↳transientBucketId) VALUES ("0.031941633603" ,"-48.6400888889" ,"32.534" ,"II" ,
↳"1328883") ON DUPLICATE KEY UPDATE cmSepArcsec="0.031941633603", decDeg="-48.
↳6400888889", raDeg="32.534", spectralType="II", transientBucketId="1328883",
↳updated=IF(cmSepArcsec="0.031941633603" AND decDeg="-48.6400888889" AND
↳raDeg="32.534" AND spectralType="II" AND transientBucketId="1328883", 0, 1),
↳dateLastModified=IF(cmSepArcsec="0.031941633603" AND decDeg="-48.6400888889"
↳AND raDeg="32.534" AND spectralType="II" AND transientBucketId="1328883",
↳dateLastModified, NOW()) ;
INSERT INTO `mysql_table` (cmSepArcsec,decDeg,raDeg,spectralType,
↳transientBucketId) VALUES ("0.0068727452775" ,"8.43016111111" ,"1.47329166667" ,
↳"SN Ia" ,"1321322") ON DUPLICATE KEY UPDATE cmSepArcsec="0.0068727452775",
↳decDeg="8.43016111111", raDeg="1.47329166667", spectralType="SN Ia",
↳transientBucketId="1321322", updated=IF(cmSepArcsec="0.0068727452775" AND
↳decDeg="8.43016111111" AND raDeg="1.47329166667" AND spectralType="SN Ia" AND
↳transientBucketId="1321322", 0, 1), dateLastModified=IF(cmSepArcsec="0.
↳0068727452775" AND decDeg="8.43016111111" AND raDeg="1.47329166667" AND
↳spectralType="SN Ia" AND transientBucketId="1321322", dateLastModified, NOW())
↳;
INSERT INTO `mysql_table` (cmSepArcsec,decDeg,raDeg,spectralType,
↳transientBucketId) VALUES ("0.00434670577101" ,"-42.3442805556" ,"35.3427916667
↳" ,"Ia" ,"1307226") ON DUPLICATE KEY UPDATE cmSepArcsec="0.00434670577101",
↳decDeg="-42.3442805556", raDeg="35.3427916667", spectralType="Ia",
↳transientBucketId="1307226", updated=IF(cmSepArcsec="0.00434670577101" AND
↳decDeg="-42.3442805556" AND raDeg="35.3427916667" AND spectralType="Ia" AND
↳transientBucketId="1307226", 0, 1), dateLastModified=IF(cmSepArcsec="0.
↳00434670577101" AND decDeg="-42.3442805556" AND raDeg="35.3427916667" AND
↳spectralType="Ia" AND transientBucketId="1307226", dateLastModified, NOW()) ;
````
```

Methods

| | |
|----------|--|
| search() | <i>Return the results of the database conesearch</i> |
|----------|--|

Properties

| | |
|-------|---|
| query | <i>return the sql query for the HTM trixel search</i> |
|-------|---|

search ()

Return the results of the database conesearch

Return

- conesearch

Usage

See class usage.

property query

return the sql query for the HTM trixel search

Usage

cs.query

2.3 Functions

| | |
|---|---|
| <code>HMPy.mysql.add_htm_ids_to_mysql_database_table</code> | Given a database connection, a name of a table and the column names for RA and DEC, generates ID for one or more HTM level in the table |
|---|---|

2.3.1 add_htm_ids_to_mysql_database_table (function)

add_htm_ids_to_mysql_database_table(raColName, declColName, tableName, dbConn, log, primaryIdColumnName='primaryId', cartesian=False, batchSize=50000, reindex=False, dbSettings=False)

Given a database connection, a name of a table and the column names for RA and DEC, generates ID for one or more HTM level in the table

Key Arguments

- raColName – ra in sexagesimal
- declColName – dec in sexagesimal
- tableName – name of table to add htmid info to
- dbConn – database hosting the above table
- log – logger
- primaryIdColumnName – the primary id for the table
- cartesian – add cartesian columns. Default *False*
- batchSize – the size of the batches of rows to add HTMIDs to concurrently. Default *2500*
- reindex – reindex the entire table
- dbSettings – yaml settings for database

Return

- None

Usage

```
from HMPy.mysql import add_htm_ids_to_mysql_database_table
add_htm_ids_to_mysql_database_table(
    raColName="raDeg",
    declColName="decDeg",
    tableName="my_big_star_table",
    dbConn=dbConn,
    log=log,
    primaryIdColumnName="primaryId",
    reindex=False
)
```

2.4 A-Z Index

Modules

| | |
|--------------------------------|--|
| <code>HMpTy.commonutils</code> | <i>common tools used throughout package</i> |
| <code>HMpTy.htm</code> | <i>The HTM and Matcher Objects</i> |
| <code>HMpTy.mysql</code> | <i>MySQL tools involving HTMs</i> |
| <code>HMpTy.htm.htm</code> | <i>Tools for working with Hierarchical Triangular Meshes, including coordinate crossmatching</i> |
| <code>HMpTy.utKit</code> | <i>Unit testing tools</i> |

Classes

| | |
|-------------------------------------|---|
| <code>HMpTy.htm.htm.HTM</code> | <i>A Hierarchical Triangular Mesh object</i> |
| <code>HMpTy.htm.htm.Matcher</code> | <i>A matcher-array object to match other arrays of ra,dec against</i> |
| <code>HMpTy.htm.sets</code> | <i>Given a list of coordinates and a crossmatch radius, split the list up into sets of associated locations</i> |
| <code>HMpTy.mysql.conesearch</code> | <i>The worker class for the conesearch module</i> |

Functions

| | |
|--|--|
| <code>HMpTy.mysql.add_htm_ids_to_mysql_database</code> | <i>Given a database connection, a name of a table and the column names for RA and DEC, generates ID for one or more HTM level in the table</i> |
|--|--|

RELEASE NOTES

v1.5.5 - December 8, 2021

- **FIXED** Install on macOS monterey

v1.5.4 - August 16, 2021

- **FIXED** Command-line tools

v1.5.3 - June 23, 2020

- **FIXED** When matching 2 lists of coordinates, if a list location was matched against more than one item in the second match list the angular separation of the first match got over-written by the second match.

v1.5.1 - May 19, 2020

- **FIXED** MacOS install was needlessly involved.

v1.5.0 - May 8, 2020

- Now compatible with python 3.*

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