

# Hit and Peak Finders

## Peak Finding

You can find more advanced examples [here](#) and some overview documentation [here](#). More detailed documentation (including description of parameters) is [here](#). You can look at an image and interactively tune the peak-finding parameters using the "psocake" software shown [here](#) (see the peak-finding section).

This script lives in `/sdf/group/lcls/ds/ana/tutorials/psana1_examples/peakFinder.py`. A peak finder runs on an area detector and tries to locate regions of charge (e.g. photons).

```
import psana
ds = psana.DataSource('exp=xpptut15:run=54:smd')
det = psana.Detector('cspad')
from ImgAlgos.PyAlgos import PyAlgos
alg = PyAlgos()
alg.set_peak_selection_pars(npix_min=2, npix_max=50, amax_thr=10, atot_thr=20, son_min=5)
hdr = '\nSeg  Row  Col  Npix    Amptot'
fmt = '%3d %4d %4d  %4d  %8.1f'
for nevent, evt in enumerate(ds.events()):
    if nevent >= 2 :
        break
    nda = det.calib(evt)
    if nda is None:
        continue
    peaks = alg.peak_finder_v4r2(nda, thr_low=5, thr_high=21, rank=4, r0=5, dr=0.05)
    print(hdr)
    for peak in peaks :
        seg, row, col, npix, amax, atot = peak[0:6]
        print(fmt % (seg, row, col, npix, atot))
```

## Hit Finding

This script lives in `/reg/g/psdm/tutorials/examplePython3/hitFinder.py`. These hit finding algorithms try to determine if a particular LCLS shot was good or not, by looking for significant charge distributed over an area detector.

```
import psana
ds = psana.DataSource('exp=xpptut15:run=54:smd')
det = psana.Detector('cspad')
from ImgAlgos.PyAlgos import PyAlgos
alg = PyAlgos()
for nevent, evt in enumerate(ds.events()):
    if nevent >= 2 : break
    nda = det.calib(evt)
    if nda is None: continue
    thr = 20
    numpix = alg.number_of_pix_above_thr(nda, thr)
    totint = alg.intensity_of_pix_above_thr(nda, thr)
    print(f'{numpix:d} pixels have total intensity {totint:5.1f} above threshold {thr:5.1f}') # (numpix,
totint, thr)
```

## References

- [Advanced Hit Finders and Peak Finders](#)
- [Peak Finding Details](#)
- [Hit and Peak Finding Algorithms](#)
- [Psocake](#)
- [pypsalgos](#) - code documentation